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An Address

[ABRIDGED]

ON

THE MEDICAL PERSPECTIVE OF MULTIPLE EXTRACTIONS

AND OTHER MAJOR DENTAL OPERATIONS.

Delivered to Post-graduates at the Royal Dental Hospital on March 28th, 1928,

BY HARVEY HILLIARD, C.B.E., M.D. ZÜRICH, M.R.C.S. ENG., D.P.H.,

SENIOR ANÆSTHETIST TO THE HOSPITAL.

THE extraction of teeth is so painful, and is sometimes accompanied by so much shock, that before the discovery of anæsthesia it was never resorted to except for the relief of pain—or as a means of raising revenue, if the history books describing the habits of the earliest English kings are to be believed. In consequence, oral sepsis was rampant, the general health suffered, people did not live so long, and the death-rate was much higher than it is now.

Even after the introduction of nitrous oxide gas, for many years no one would have a tooth extracted unless it were aching, or visit the dentist except for the relief of pain. This was because, in the early days, the gas was impure and was administered badly and with very little knowledge of its physiological action and after-effects; it made many people feel so ill that they preferred to have a tooth out without any anæsthetic at all. They avoided visiting the dentist, except for the relief of pain, because it was not then generally known that decaying teeth poison the whole system and undermine the general health. Now we know better; people take more care of their teeth and, I am told, the hygiene of the mouth is taught in the public elementary schools—in America.

Even to-day, however, cases of extreme oral sepsis are an everyday occurrence and extensive operations have to be performed for the removal of teeth too septic to be saved. Unhappily, the present practice, all too commonly, is to perform these severe operations at the dentist's surgery, after which the patient has to take a journey home, shocked, bleeding and nauseated; not only this, but if the operation has not been completed and has to be done "piecemeal" on successive occasions, he is depressed both mentally and physically in anticipation of having to go through the ordeal again. Further, he may suffer symptoms of severe illness, with signs of general toxæmia, as a result of absorbing a large dose of toxin from the sockets of the teeth which have been removed, since these sockets become heavily infected from the teeth which remain.

AN EVIL TRADITION.

Why, then, are these operations usually performed at the dentist's surgery rather than at the patient's own home? It is because of the tradition. But, apart from the "odontophobia," if I may coin a word, or the "dental retention complex" (as the psycho-analysts might say) how has this tradition arisen?

It has become the custom for the patient to visit the dentist, rather than for the dentist to visit the patient, because it used to be very rare for more than one tooth to be removed at a time and the extraction of a single tooth was considered a trivial operation—at least by the dentist! It was more expedient and saved time to proceed in this manner, and there was the advantage of operating in a special dental chair, in a good light, and where all the necessary instruments are at hand. With the introduction of anæsthesia extractions became more extensive, but still the patient had to go to the dentist; because when first introduced the nitrous oxide gas was prepared only at the dentist's house, being stored in gasometers ready for use when required. The introduction of compressed and liquefied nitrous oxide in steel cylinders, thus making it readily portable, should have changed the procedure in the cases in which two or three extractions were necessary, but the tradition had arisen and traditions die hard; also, apparently, it did not occur to anyone that things might be done more comfortably and with less risk for the patient.

More recently still, the nasal method of administering nitrous oxide (introduced by Mr. Frank Coleman and myself in 1898) whereby anæsthesia can be indefinitely prolonged, has led to very extensive operations being performed under nitrous oxide, and on numberless occasions I have been asked thus to administer the gas for complete clearance of the teeth from both upper and the lower jaws and for other long dental operations. Picture what this means to the patient concerned. Consider the wounds made. I have measured many teeth and find that on the average the unerupted portion—that is to say, the portion from the gum margin to the apex, is 13 mm. If, therefore, ten teeth only, including one or two molars, are extracted, the sum of the depths of the sockets will amount to 150 mm., equalling a linear incision about *6 in. long*. But this is reckoning the depths of the sockets only; it does not take into account the superficial area of the whole of each socket, which cannot be less than, say, ¼ sq. in., making a total of approximately 2½ sq. in.

Imagine a skin wound 6 in. long, or more seriously 2½ in. square; imagine it left an open wound or covered with blood-clot, as in the case of the sockets, and assess what the "moral and intellectual damages" apart from the physical damage to the patient would be. Would the patient think of having such a wound made in the surgeon's consulting room and then go home afterwards? Would he not insist rather that the operation should be done in his own house or in a nursing home, so that, if he felt like it, he could immediately thereafter go to bed? Would he not expect every antiseptic precaution to be taken, proper dressings applied, all the ceremonial, all the solicitude of sympathetic friends usually associated with an Operation? Of course he would, and I hope that both surgeon and anæsthetist would be paid accordingly. But no one thinks anything of teeth, and the unfortunate anæsthetist, although he is the specialist who alone has made the operation possible and may have administered the anæsthetic with the greatest skill and with minimal interference with the patient's normal conditions and functions of life, receives but a small fee; because the patient does not realise either the experience or skill required, or the extent of his indebtedness; nor can he imagine what his sensations might otherwise have been. The dental surgeon is partly responsible for this; for some reason, I have not yet been able to discover, instead of putting all the facts before the patient and advising him that the operation is a major one and that it should be performed under ideal conditions, he makes light of the whole business and cannot therefore ask an adequate fee either for himself or for the anæsthetist. If patients were made to realise the truth and were made to understand what such an operation really involves, and if they were given the choice of having the operation done at one sitting in their own homes (or a nursing home) or of having it done piecemeal at the dentist's surgery, I believe they would plump for comfort every time and, moreover, would be willing to pay extra for it.

ABSORPTION OF TOXINS.

I have cited the instance of an ordinary superficial skin wound, but I cannot too strongly emphasise the fact that the wounds involved in the extraction of but ten teeth are far more serious. They are not merely superficial wounds in the gum but extend deeply into the cancellous tissue of the jaw bones. Such

tissue is notoriously very absorbent, and the patient may get a dangerous dose of toxin, because the tooth sockets immediately become filled with infected blood-clot, which is the best culture-medium in the world for pathogenic germs. For this reason many physicians advise, when patients are already debilitated by the absorption of toxins from chronic oral sepsis, or are suffering from some other disease in one or other of its protean forms which result from the absorption, that one or two teeth only be extracted at a time, and that when the patient has got over the direct effects of the extra dose of poison absorbed, the operation should be continued thus piecemeal until completion. They argue that if more than one or two teeth were taken out, the direct after-effects would increase in direct proportion and that the patient might be made more ill in consequence, because the tooth sockets would become heavily infected by the septic teeth remaining. I venture the opinion that this argument is fallacious, for my experience during the last 30 years is that patients suffer much less in every way if major dental operations are conducted in the manner I have suggested than they do when the operations are performed in successive stages. I believe that the sum of the results from the multiple successive doses of auto-intoxication is greater and more debilitating than are the results of the single dose of poison absorbed when the mouth is cleared of all septic material at one operation, because there are no teeth left to infect the sockets. I know of several cases that have suffered severely as the result of several successive extractions of acutely septic teeth with pyorrhœa. I know of one case of death, from pernicious anæmia, following this method of dealing with multiple dental caries; this patient was not suffering from pyorrhœa when the extractions began; he stated that his anæmia only began after the extractions were finished; he was not anæsthetised by me, but he told me that he was made increasingly ill by each successive administration of gas, and he attributed his anæmia to these repeated administrations. It is, of course, impossible to say if this were so, as no blood examinations were made until anæmia had manifested itself; but we do know that nitrous oxide gas does cause temporary blood changes, and it is not unreasonable to argue that if more gas is administered before the blood has had time to recover from the first dose, the more profound is the blood change likely to become and that possibly the organs concerned in blood-making may lose their recuperative power.

Recommendations.

So much for the old practice: what of the new? I submit for your consideration the following suggestions:—

1. That multiple extractions should be treated as one major operation.
2. That the patient should be medically examined before the operation is undertaken, having at the same time an examination of the blood.
3. That the patient should be properly prepared for the operation.
4. That the operation should be performed at the patient's own home or in a nursing home or hospital, so that immediately thereafter the patient can be put to bed and proper care and after-treatment be insured.
5. That a proper period of convalescence should be arranged for and that the patient should be immediately fitted with a temporary denture, so that he can partake of the diet he has found by experience best suited to him, and thus be saved from the risk of being half-starved, with its inherent danger of consecutive disease.

Some amplification of some of these points is necessary.

The *preparation of the patient* may include a course of heart tonics and correction of the low blood pressure usually associated with the condition necessitating these operations. A course of intestinal antiseptics may also be given and possibly ultra-violet irradiation both general and local. It must include suitable diet with a view to preventing subsequent acidosis, irrespective of whether chloroform is to be administered or not, because shock may be a factor in producing this serious sequela of operations.

The *place for operation* is, I consider, of extreme importance. If it is performed at home, not only is the patient saved unnecessary suffering, but we add materially to his comfort and shorten the period of his convalescence and ultimate restoration to health. Many risks inherent in the operation itself, and the risks of subsequent inflammation and general septic infection are obviated.

Convalescence is peculiarly the province of the physician, and its importance I think needs stressing somewhat, for in hospital practice, at least, patients are usually given no advice concerning it, but are allowed immediately to resume, if they can, their ordinary avocations. Generally they are unfit for this, and if they attempt it their convalescence is unduly protracted; they must be inefficient meanwhile, and during the period of debility they incur the risk of developing some general disease.

The importance of the temporary denture can be gauged by considering how much of a hard day's work can be efficiently performed on pap. I will not expatiate on the harmful effects of patients being left edentulous for several months; but I may mention that I have seen many adult patients who have suffered in mind, body and estate from not being able to eat anything but baby food, because they were left with no teeth.

Induction of Anæsthesia.

As I am not an operator, I can refer only to the medical and the anæsthetic aspect of operative technique. I submit that for the attainment of the best results the closest coöperation between doctor and dentist is necessary, before, during, and after the operation. In this connexion it goes without saying that a general anæsthesia must be maintained of sufficient duration for a possibly protracted operation. For this the patient should be properly prepared, since local anæsthesia or regional anæsthesia are inadmissible in these cases. I may here mention that on several occasions I have had to maintain general anæsthesia for over an hour for exceptionally difficult extractions; for instance, the removal of impacted and misplaced unerupted teeth necessitating sawing, drilling or chiselling away the surrounding bone; and more commonly, impacted lower wisdom teeth.

How, then, may such an anæsthesia be obtained? In my experience it is best to give a preliminary hypodermic injection of atropine gr. 1/100—and in certain cases this may be combined with gr. ¼ or gr. ½ of morphia—half an hour before the operation. Morphia allays the patient's apprehension and is a great comfort to him; it is a comfort also to the anæsthetist because it inhibits reflex action and enables him to maintain a much lighter plane of anæsthesia than otherwise would be possible. In many cases this preliminary administration of morphia produces a prolonged anodyne effect and relieves the after-pain of the operation. The atropine diminishes the secretion of the salivary glands and of the mucous glands of the respiratory passages and so renders the field of operation more dry: thus the patient's respiration is not embarrassed by the mucus and salivary secretion even if ether be administered. Atropine also lessens the risk of post-operative bronchitis. If a full dose of atropine be administered, it is possible to give ether instead of chloroform throughout a very protracted operation. Atropine diminishes the reflex excitability of the vagus and thereby reduces the risk of reflex inhibition of the heart. Provided that a preliminary hypodermic injection of morphia and atropine can be given, it is possible to keep the patient anæsthetised with nitrous oxide and oxygen administered nasally for very considerable periods. Such an injection cannot, however, be given if the operation is to be performed at the operator's surgery or if the patient has to take a journey home immediately afterwards.

With more serious operations, such as removal of growths of the jaws or removal of the jaw itself, or even the removal of misplaced unerupted teeth and similar operations of a less grave nature, it is usually better to induce anæsthesia with a mixture of chloroform and ether and then continue with chloroform alone, administered by means of a Junker's apparatus through an oral or nasal tube. The posture of the patient is important. He should be recumbent on an operating table, with the left shoulder raised and the head turned slightly to the right, so that blood may drain into the lower cheek and out at an angle of the mouth, without the risk of becoming inhaled or swallowed, with the added danger of asphyxiation on the one hand, or of distressing after-vomiting on the other. With the patient in this position a sponge can be inserted into the mouth, serving the double purpose of absorbing blood and secretions and of acting as a screen, preventing any foreign body reaching the respiratory passages. If, however, the operator prefers to work with the patient in the sitting posture, this may be arranged, provided the anæsthetic is administered in this position from the outset. On very many occasions I have had to administer chloroform in the sitting posture because this posture is preferred by some operators; it certainly has the advantage of diminishing the bleeding, but undoubtedly it is more dangerous when the patient is under chloroform or ether.

Sequelæ of Operation.

The after-effects depend in direct ratio first and most importantly upon the duration of the anæsthesia; secondly, upon the amount of trauma caused in the mouth; and, finally, upon the amount of toxin absorbed.

The first two of these points need no amplification, for the moral they point is obvious—namely, that the patient should not be kept under the influence of the anæsthetic a moment longer than is absolutely necessary, and that the operation should be performed with the least possible damage to the tissues involved. The last depends partly upon the skill of the operator, partly upon the preliminary cleansing of the mouth, and chiefly upon the nature of the operation performed and the degree of cleanliness maintained after its completion. I have seen some operators—notably Mr. W. H. Dolamore, who I believe introduced the method—sew up the lacerated margins of the gums, after careful cleansing of the sockets, to prevent sloughing and to promote rapid healing. This method, in my experience, is followed by most satisfactory results. Others syringe out the cavities immediately after the extractions are complete and continue this antiseptic treatment throughout the convalescence. If these methods are employed, and if the after-care is properly conducted by the physician in charge, the patients suffer the minimal disturbance of the conditions and functions of life and the least possible shock and mental distress; their recoveries are amazingly rapid and the improvement in their general health after the removal of the source of their toxæmia is most gratifying to all concerned.

Mr. Geoffrey Keynes has prepared a "Bibliography of the Works of William Harvey," containing eight collotypes and numerous facsimiles in line. It will be published by the Cambridge University Press, in a limited edition of 300 copies, to celebrate the tercentenary of the publication of "De Motu Cordis."

Donations and Bequests.—Miss H. Knealy has given £3000 to endow a bed in the Royal Free Hospital for women authors and £4000 to endow a bed for journalists of either sex in a private ward to be named the "Knealy" Ward. These gifts are in memory of her brother.—The late Sir Harry Poland, K.C., among other bequests, left £500 to the Dover Hospital, Dover; £500 to the Mayor of Dover for the time being, for distribution amongst such charities in Dover as he, in his absolute discretion, may think fit; and £100 each to a number of medical charities.—Mr. Charles Coxhead, Lindsay, M.I.C.E., of Harley House, Regent's Park, N.W., besides other bequests, left £5000 to the Royal Hospital for Sick Children, Yorkhill, Glasgow, to endow a ward, £100 each to the Glasgow Royal Infirmary, the Western Infirmary, and the Victoria Infirmary, Glasgow.

AURICULAR FLUTTER.*

A STUDY OF FIVE CASES.

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Auricular flutter is closely allied to fibrillation, but is much less frequently encountered. Lewis [1] has shown that auricular flutter is due to a "circus movement" in the auricles—namely, the continuous movement of a contraction wave in a ring of muscle, such as that which surrounds the mouths of the superior and inferior venæ cavæ or the mitral orifice. This revolving wave of contraction governs the movement of the auricles; it is inefficient as compared with the normal auricular systole; there is no starting-point, the wave moves continuously in a circular path, and its crest is separated from its wake by a gap of responsive and temporarily uncontracted muscle. Flutter may occur in paroxysms, appearing and disappearing abruptly, but once established it usually persists for months or years. The usual rate of the flutter circus movement is about 300 per minute. The ventricle can rarely respond to every auricular circus movement and it generally responds to each alternate one—2 : 1 block; the resulting ventricular tachycardia, however, is usually at a rate sufficiently high (generally about 150 per minute) to cause circulatory embarrassment.

In auricular fibrillation the rate of the auricular circus movement is higher, about 450 per minute, and the circus movement is irregular inasmuch as the same path is not followed from cycle to cycle; a single circus movement does exist, but the path changes constantly in its details while following the same general direction. In flutter the gap of responsive muscle between the crest and wake of the circus movement is about 1/5th of the whole circle in which the wave moves; in auricular fibrillation the gap is shorter and the wave of contraction flows through muscle in which more fibres are irresponsive. The close relation between flutter and fibrillation is shown by the fact that the former may pass into the latter under treatment. In flutter or auricular fibrillation, if the refractory period lengthens or the rate of propagation of the wave increases, the gap shortens; if the refractory period shortens or conduction decreases the gap widens. If the former changes are of such magnitude that the gap disappears the crest of the wave overtakes its wake; if, then, the muscle at the wake of the wave remains a little longer in the refractory state, the circus movement comes to an end. When this happens clinically the arrhythmia ceases and the dominant normal sinus rhythm is usually restored.

Action of Drugs on the Auricle.

(1) *Quinidine*,[2] by acting directly on the auricular muscle, prolongs the effective refractory period; it also shows conduction, and therefore the transmission intervals widen and the auricular rate diminishes. The lengthening of the effective refractory period tends to close the gap of a circus movement and to bring the latter to an end, whilst the slowing of conduction tends to have the opposite effect. It is only when the action of quinidine in lengthening the effective refractory period is greater than its action in slowing conduction that this drug is effective in abolishing clinical auricular fibrillation; thus is explained the fact that quinidine is therapeutically efficient only in about 54 per cent. of cases of auricular fibrillation. When it is unsuccessful its effect is probably more marked in slowing conduction (or the gap being shortened, owing to increase of the effective refractory period, the circus movement is diverted into a longer path, where a sufficiently large gap for its maintenance may persist).

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* From the Mater Misericordiæ Hospital, Dublin.

Quinidine, also, partly (in experiments completely) depresses vagus action (probably by acting on the nerve ganglia), and it therefore acts indirectly on the auricular muscle by increasing the effective refractory period. These effects of quinidine are more in evidence in auricular fibrillation than in flutter. There is also evidence that this drug may produce delay in intraventricular conduction, which is evidenced electrocardiographically by changes in the height, width, and form of the Q R S complex (as illustrated in Case 2).

(2) *Digitalis.*[3]—Full therapeutic doses of this drug, by increasing vagal tone, reduces the length of the refractory period and tend to increase the rate of conduction; digitalis, therefore, usually increases the rate of the circus movement in auricular fibrillation. On the other hand, by acting directly on the heart muscle, it increases the length of the refractory period, and, when the heart muscle is responding rapidly, retards conduction and therefore tends to decrease the rate of the auricular oscillations. The predominant action of the drug seems to be through the vagus, because in practice the rate of the auricular oscillations in fibrillation are, as a rule, somewhat increased. From the point of view of closure of the gap, however, these two actions are opposed to each other, and therefore the circus movement is rarely abolished by digitalis action. Lewis showed that flutter may frequently be converted into fibrillation by the action of digitalis, and that, if the drug be then discontinued, normal sinus rhythm will often appear. It is not fully understood how flutter may be converted into fibrillation by the use of digitalis; the fundamental differences between the two conditions seem to be that in fibrillation the refractory period is less, the path of the circus movement shorter, the rate of the circus movement greater, and the gap smaller than in flutter; if, now, the vagus action of digitalis is predominant in flutter the refractory period is shortened, conduction rate is increased, and the rate of the circus movement is increased; the gap may therefore become shorter. In other words, there is a shifting of all these properties in a direction which could, one would suppose, favour the conversion of flutter to fibrillation.

The treatment of auricular fibrillation with digitalis and quinidine is fairly well understood and comparatively successful, but, since flutter is relatively rare, reports of its treatment are not numerous. There seems to be a common belief that quinidine should not follow digitalis without an interval, but it is not easy to discern any reason why one should wait until the digitalis effect has worn off—indeed, the argument seems to point the other way.

This paper records five cases of auricular flutter which may be of interest.

CASE 1.—It was not possible to study this case in detail. Clergyman, aged 69 years, seen July 9th, 1923. Height 6 ft. 2 in. Family history and previous history not relevant.

Complaint.—Palpitation and rapid pulse-rate for two years previously; some breathlessness on moderate exertion; feet and ankles became swollen towards evening; the patient, however, stated that he was not greatly restricted in his activities and could attend to his duties fairly efficiently.

Physical Examination.—Radial and brachial artery walls slightly thickened; retinal arteries appeared normal; heart found on palpation and percussion to be slightly enlarged to the left. Pulse-rate varied from 108 to 120 and the pauses between the beats were often somewhat unequal, but there was no gross irregularity; the beats were of equal strength. Blood pressure 180/80. The urine contained a trace of albumin and occasional granular casts, calcium oxalate crystals, and a few white and red blood cells. The prostate was somewhat enlarged. There were no other abnormalities on clinical examination. An electrocardiogram† showed auricular flutter with 2 : 1 to 3 : 1 block (Fig. 1). Pressure over the vagi did not slow the pulse.

Treatment.—The patient received 1 g. of digipuratum and grs. 13½ of powdered digitalis leaves over four days; on the third day the pulse-rate began to drop and on the fourth it was about 70 per minute. An electrocardiogram then showed that auricular flutter still persisted, but that the degree of block had increased to 4 : 1, giving a pulse-rate of about 70; the blood pressure was 186/100. 30 minims of tincture of digitalis per day, by mouth, sufficed to keep the ventricular rate thereafter about 70 per minute. The patient was advised to take the 30-minim dose of tincture of digitalis every day and was given suitable instructions in relation to work, diet, and exercise; he was discharged on the understanding that he was to report from time to time. He was not seen again until July 24th, 1924, when I was called to the country to examine him. He was suffering from mental confusion with some cerebral excitement; the axillary temperature was 100° F., but physical examination was otherwise negative; he was still taking the digitalis as prescribed, and his pulse was regular at a rate of 76 per minute. The blood pressure was 200/110. It was not possible to get a polygraph tracing. He was put on a salt-poor diet and made a complete recovery in a few weeks. He paid a flying visit in May, 1925, and appeared to be in good health with pulse-rate 76 and regular, blood pressure 176/100, and heart only slightly enlarged to the left. He was still taking digitalis. He was advised to come for electrocardiographic examination, but did not do so until Sept. 5th, 1925; at that time the pulse-rate was regular at 74 per minute, blood pressure 172/102, and the heart slightly enlarged to the left; he looked and felt well and was able to carry on his work at a slightly reduced level in comfort. The electrocardiogram showed sinus rhythm, flutter having disappeared, with splintering of Q R S in lead III. (place accidentally destroyed). He was advised to discontinue the digitalis, which he was still taking. He reported on Jan. 10th, 1926, and was found to be in good health and fairly active; the pulse-rate was 74 and regular. He refused electrocardiographic examination. He returned again on May 30th, 1927; he stated that he was comparatively well and was able to walk, at a moderate rate, from four to six miles per day and to carry out his duties fairly efficiently. For the last three weeks he had noticed that his pulse was slightly irregular, but this did not cause him any inconvenience. His blood pressure was 170/110 and pulse-rate 102. The impulse beat was 12·5 cm. from the middle line in the fifth space. The radial artery walls were normal or very slightly thickened. The pulse was slightly irregular in rate and perhaps in force. Electrocardiographic examination showed auricular flutter with 4 : 1 block, otherwise the electrocardiogram was normal. He had not used salt for almost three years. In view of the fact that the circulation seemed to be fairly efficient, that there was a 4 : 1 block, and also because of his age and of the possibility of intra-auricular thrombi, it was decided not to attempt to abolish the flutter. He was accordingly advised to take 22 minims of tincture of digitalis once a day. He was seen again on August 20th, 1927; at that time the blood pressure was 156/92, the impulse beat was 13·5 cm. from the middle line, and the pulse-rate was 74 and regular; he had given up taking digitalis for two weeks previously. The electrocardiogram revealed auricular flutter with a 4 : 1 ventricular response (Fig. 2). He stated that he felt well and could attend to his work and take a moderate amount of exercise without inconvenience. He returned again on Oct. 4th, 1927, complaining of slight breathlessness on exertion. The electrocardiogram now showed flutter with 2 : 1 to 3 : 1 block and the pulse-rate was about 108 and slightly irregular; he had taken no digitalis for about eight weeks. The blood pressure (auscultatory method) was 170/90; it was noticed that only half the beats came through to the wrist, or were audible over the brachial artery, from 170 to 120 mm. Hg during decompression of the armlet of the sphygmomanometer, but all came through from 120 to 90 mm. Because these features seemed to indicate a doubtful prognosis, and because of apparent escape of the auro-ventricular node from digitalis control, with consequent increased ventricular rate, the patient was again put on digitalis—27 minims of the tincture per day. When seen on Oct. 27th, 1927, he was still taking digitalis as prescribed, the pulse-rate was 86 per minute, and his only complaint was very slight breathlessness on moderate exertion and consciousness of his heart beat when lying on his left side; he stated that he felt improved; the electrocardiogram showed flutter with 3 : 1 to 5 : 1 block (occasionally 2 : 1); the pulse-rate was 90 and slightly irregular; the blood pressure was 152/90, all beats coming through to the wrist at 152 mm. Hg. The patient returned on Dec. 5th, 1927; he was still taking 27 minims of tincture of digitalis per day; the blood pressure was 172/84, pulse-rate 76 and regular, and impulse beat about 11 cm. from the middle line. The electrocardiogram showed sinus rhythm (Fig. 3); a few days after his previous examination (Oct. 27th, 1927) he became aware that the slight breathlessness on exertion had disappeared and that he was no longer aware of the beating of his heart when lying on his left side as he had been for some months previously. When, in what manner, and why flutter disappeared cannot be stated, but apparently our fear in this case that the inducting of sinus rhythm might cause detachment of thrombi was groundless.

† Time marker shows fifths and twenty-fifths of a second; 1 cm. excursion of string is equal to one millivolt. The tracings are reduced for publication.

Comment on Case 1.

It is unprofitable in this case to speculate on when or how, in the first instance, auricular flutter gave place to sinus rhythm, as the observations were of necessity so infrequent and imperfect. It is interesting to note the relapse to flutter which apparently occurred after an interval of almost two years, as far as one can judge from the history. Final treatment directed towards the abolition of flutter and the restoration of sinus rhythm (by larger doses of digitalis followed by quinidine as described later) was considered unwise in this patient owing to the possibility of the presence of intra-auricular thrombi, which might become detached if sinus rhythm were induced, the age and the likelihood of progressive degenerative myocardial change; moreover, the efficiency of the circulation was quite good when digitalis was given in such daily doses that 3 : 1 to 4 : 1 auriculo-ventricular block was maintained even while auricular flutter continued. However, sinus rhythm appeared finally after some months of digitalis treatment without quinidine and with no untoward results. It is of interest to note the presence of flutter at a comparatively advanced age—flutter was last observed when the patient was 73 years old—especially as the consequent heart failure was easily controlled by digitalis and as flutter finally disappeared with no symptoms of detachment of intra-auricular thrombi.

CASE 2.—A farmer, aged 39 years, consulted me on Dec. 15th, 1925. He was 6 ft. 1¼ in. in height and weighed 240 lb. He complained of fluttering in his chest and dyspnœa on slight exertion.

Previous History.—Measles and mumps in childhood; typhoid fever when 18 years old; gonorrhœa 12 years ago. Both knees became swollen and painful nine years ago and there was also slight swelling of the ankles; he recovered after about ten days in bed and does not know whether he had a rise of temperature; his tonsils were removed ten months later, although he was never subject to sore-throat.

Present Illness.—On Dec. 1st, 1925, he noticed dyspnœa, palpitation, and tachycardia on slight exertion, but these symptoms disappeared on resting; since then the same symptoms had recurred several times, sometimes while resting, but they were especially prone to appear after breakfast or on exertion. I saw him for the first time in an attack which had apparently persisted for at least six days.

Physical Examination.—Face slight cyanotic, slight œdema of legs, heart seemed somewhat enlarged to the left, but difficult to map out. No cardiac murmurs. Pulse and heart-rate about 172 per minute and regular. Liver and spleen not palpable. Lungs normal. Blood pressure 112/90. Blood Wassermann reaction negative. The electrocardiogram showed auricular flutter, with 2 : 1 block (Fig. 4). Pressure over vagi or eyeballs did not slow the pulse.

Course and Treatment.—It was decided to try the effect of quinidine sulphate by mouth after the administration of 0·4 g. had shown that the patient did not have an idiosyncrasy for the drug. From Dec. 18th to 24th 14·8 g. of quinidine sulphate were given by mouth, in doses of 0·4 g. as follows:—

Dec. 18th ..	1 × 0·4 = 0·4 g.	Dec. 22nd..	6 × 0·4 = 2·4 g.
,, 19th ..	4 × 0·4 = 1·6 g.	,, 23rd ..	5 × 0·4 = 2·0 g.
,, 20th ..	5 × 0·4 = 2·0 g.	,, 24th ..	3 × 0·4 = 1·2 g.
,, 21st ..	13 × 0·4 = 5·2 g.		

After 9·2 g. of the drug had been taken (Dec. 21st) the flutter waves became increased in length, apparently due to slower auricular conduction, and their rate was slower than on admission. After 11·6 g. of quinidine (Dec. 22nd) these changes in the flutter waves were still more marked, and the Q R S complex, in addition to showing a varying voltage, manifested aberration in many beats (interference with the spread of the excitation wave through the ventricle); moreover, there seemed to be a tendency on the part of the ventricle to respond more frequently to the individual flutter waves (Fig. 5). Evidently these electrocardiographic changes were evidences of the toxic action of quinidine on the conduction-genetic system. The patient, whose clinical condition was quite unchanged and who was fairly comfortable while resting, then decided, against advice, to go home for Christmas.

He was readmitted on Jan. 6th, 1926. His clinical condition was about the same as on the first admission, and the electrocardiogram again showed auricular flutter, with 2 : 1 block. It was now decided to try the effect of digitalis. The preparation used was digipuratum (Knoll), given by mouth in tablet form. Previous experience had shown that full clinical digitalisation in auricular fibrillation is nearly always obtained with digipuratum by the administration by mouth of 1 g. to a patient of average weight. 1·1 g. had been given by mouth in divided doses over three days when the arrhythmia suddenly changed from auricular flutter to auricular fibrillation, the pulse- and heart-rate dropping to about 82 per minute and being fairly regular (Fig. 6). The patient now found that he could undertake moderate exercise with comfort. He again insisted on leaving the hospital to transact some urgent business (Jan. 10th), not taking digitalis.

He returned on Jan. 20th, 1926, in the same condition as on the first occasion, and the electrocardiogram showed auricular flutter with 2 : 1 block. From Jan. 21st to 22nd he received 1 g. of digipuratum in divided doses, and shortly after the last dose auricular fibrillation appeared again. As he again wished to leave hospital we decided to endeavour to induce the return of the normal rhythm with quinidine; consequently, after waiting in vain for 24 hours in the hope that, on the cessation of the digipuratum treatment the normal rhythm would appear, 2·4 g. of quinidine sulphate were given in doses of 0·4 g. every second hour. An electrocardiogram taken one hour after the last dose showed normal sinus rhythm (Fig. 7). The patient now felt quite comfortable, even on considerable exertion, and left hospital on Jan. 26th with normal cardiac rhythm, pulse- and heart-rate about 80, and blood pressure 124/76. He returned on Feb. 13th and April 21st for examination and electrocardiogram, and was in every respect normal.

On August 10th, 1926, the patient was once more admitted, suffering from an attack of auricular flutter, with 2 : 1 to 4 : 1 block, which had commenced ten days previously, the signs and symptoms being practically the same as on the first occasion. Eight-tenths of a gramme of digipuratum caused no change in the electrocardiogram; after 24 hours' interval quinidine was started and 4·8 g. were given over a period of two days, when the electrocardiogram again showed lengthening and diminished voltage of the flutter waves (2 : 1 block) with occasional slight aberration. The quinidine was then stopped. In 24 hours the flutter waves were of the same type as on admission with 2 : 1 to 4 : 1 block. After two days' interval (flutter still present) it was decided to push digitalis in the hope of again inducing auricular fibrillation, and 2·1 g. of digipuratum were given in divided doses over four days. One hour after the last dose of the 2·1 g. of digipuratum the pulse-rate suddenly fell to about 70 per minute and the electrocardiogram showed auricular fibrillation. No drug was given now for 48 hours, in the hope that on the withdrawal of digitalis auricular fibrillation would give place to normal rhythm; as fibrillation persisted 2·4 g. of quinidine sulphate were given in divided doses of 0·4 g. every two hours, and about one and a half hours after the last dose an electrocardiogram showed normal sinus rhythm with a pulse-rate and heart-rate of 76. The patient was discharged in a few days with a normal rhythm, feeling quite well even after moderate exercise.

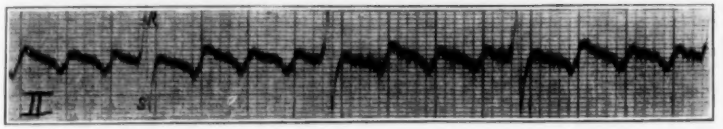
On May 26th, 1927, he returned once more, complaining that his heart trouble had suddenly developed on May 25th at about 9 P.M. Between the onset of the attack and his visit he had taken 1 g. of digipuratum by mouth. The pulse-rate was 140 per minute and slightly irregular. The electrocardiogram showed auricular flutter with 2 : 1 to 3 : 1 heart-block. He received 3·6 g. of digipuratum by mouth between the onset of this attack of flutter on May 25th and the appearance of auricular fibrillation on May 30th. It is to be noted that in this attack a large dose of digitalis was necessary to induce auricular fibrillation. On June 1st (fibrillation still present) he was given 0·4 g. of quinidine at 6 A.M., 8 P.M., and 10 A.M. (total 1·2 g.); about 11 o'clock on that morning he noticed a slight palpitation, and then he said that he felt his pulse had become steady and that he was no longer conscious of abnormal beating of the heart. He was electrocardiographed at 12 noon on the same day; the tracing showed normal sinus rhythm with a pulse-rate of 84. He was discharged that afternoon, as he had urgent business, on small doses of digitalis (12 minims of the tincture once daily). During this period in hospital a careful search was made for septic foci, and the only positive finding was by roentgenographic examination of the teeth, carried out by Dr. J. A. Geraghty, which revealed an abscess around the posterior root of the first right upper molar tooth; the tooth was extracted. On Oct. 1st, 1927, he reported that he was still well. He discontinued the digitalis in the first week of October, 1927. He returned to hospital on Nov. 17th with a pulse-rate of 140 and auricular flutter (2 : 1 block); flutter had apparently reappeared on Nov. 7th. On Nov. 18th, at 2.30 P.M., he had received 1·2 g. of digipuratum in divided doses, and the electrocardiogram at that time showed flutter 3 : 1 to 8 : 1 block; at 3 P.M. he got 0·4 g. digipuratum (total 1·6 g.), and at 6.15 P.M. on the same day auricular fibrillation was present. Next day, at 7.30 A.M., auricular fibrillation was still shown in the electrocardiogram, and 1·2 g. of quinidine was subsequently given in divided doses; at 11.30 A.M. the patient noticed some vague changes in his heart beat; at 11.42 P.M. the electrocardiogram showed sinus

ELECTROCARDIOGRAMS RECORDING RESULTS IN TREATMENT OF AURICULAR FLUTTER.

FIG. 1.

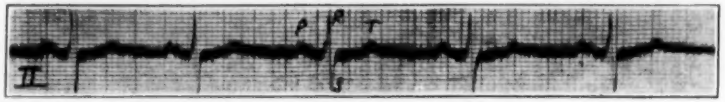
CASE 1.—Auricular flutter; 2:1 to 3:1 block; before treatment.

FIG. 2.



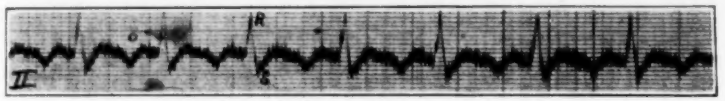
CASE 1.—Flutter under treatment with digitalis; 4:1 block.

FIG. 3.



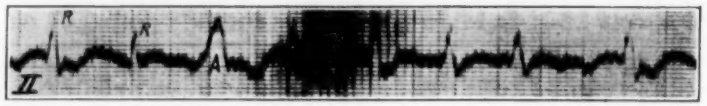
CASE 1.—Sinus rhythm after digitalis.

FIG. 4.



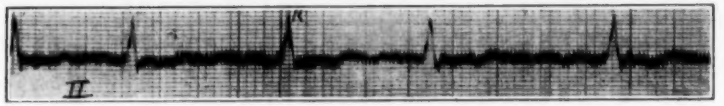
CASE 2.—Auricular flutter; before treatment; 2:1 block.

FIG. 5.



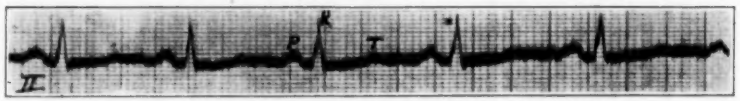
CASE 2.—Flutter after 11·6 g. of quinidine; aberration (A); slowed auricular conduction; the degree of auriculo-ventricular block is less than in Fig. 4.

FIG. 6.



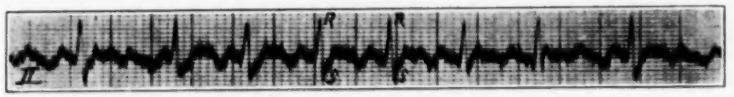
CASE 2.—Auricular fibrillation after digitalis alone.

FIG. 7.



CASE 2.—Sinus rhythm; result of digitalis followed by quinidine.

FIG. 8.

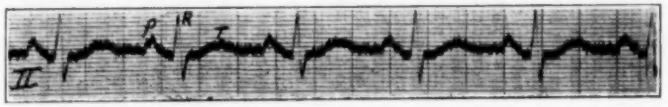


CASE 3.—Auricular flutter; before treatment 2:1 to 3:1 block.

FIG. 9.

CASE 3.—Auricular fibrillation after digitalis.

FIG. 10.

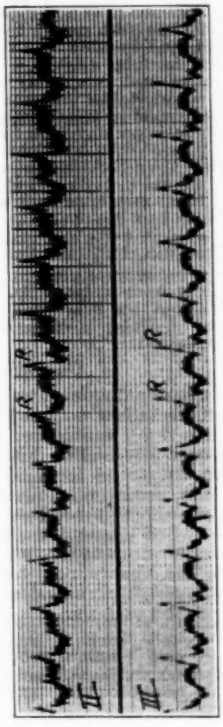


CASE 3.—Sinus rhythm; result of digitalis followed by quinidine.

FIG. 12.

CASE 3.—Paroxysmal ventricular tachycardia and auricular fibrillation; result of digitalis.

FIG. 14.

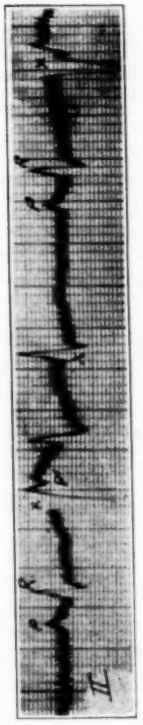


CASE 4.—Auricular flutter with 1 : 1 ventricular response.

FIG. 11.

CASE 3.—Sinus rhythm and ventricular extrasystoles arising in left ventricle.

FIG. 13.



CASE 3.—Sinus rhythm and ventricular extrasystoles (X) two and three-quarter hours after 1·6 g. quinidine.

rhythm, and the pulse-rate was 82 and the blood pressure 118/80; he was discharged feeling quite normal and directed to take 22 minims of tincture of digitalis per day. He has remained well up to the present time.

Comment on Case 2.

This case apparently illustrates the toxic effects of moderate doses of quinidine on the myocardium in auricular flutter as evidenced by the electrocardiograms—viz.: (*a*) delayed interauricular conduction and slowing of the rate of the auricular (flutter) circus movement; (*b*) ventricular aberration. These changes were taken as showing that further quinidine dosage might not be safe, and the drug was discontinued. Quinidine alone proved ineffective in abolishing auricular flutter. Digitalis alone in adequate dosage caused flutter to be replaced by auricular fibrillation, but flutter reappeared later on cessation of digitalis treatment. When auricular fibrillation replaced flutter as an effect of digitalis, a small amount of quinidine was sufficient to cause a return of normal sinus rhythm in a few hours without any "toxic" signs appearing in the cardiogram. Flutter reappeared after an interval of something over seven months and normal rhythm was restored by digitalis followed by quinidine, as on the first occasion (when quinidine alone, not preceded by digitalis, failed). Once again, after a further interval of almost ten months, flutter occurred, and on this occasion a large dose of digitalis was required to transform the arrhythmia to fibrillation, but when this was accomplished a small dose of quinidine was sufficient to restore sinus rhythm. An alveolar root abscess was the only septic focus discovered. Finally, after something over seven months, the patient discontinued the digitalis, and flutter recurred after about five weeks; on this occasion digitalis caused flutter to be replaced by fibrillation in 28 hours, and subsequently small doses of quinidine succeeded in replacing the latter by normal sinus rhythm. Thus four attacks of flutter occurred in two years, and each attack yielded to digitalis followed by quinidine, with restoration of sinus rhythm.

CASE 3.—Housewife, aged 50 years, was seen on Dec. 13th, 1926, complaining of palpitation and breathlessness on exertion. Family history not relevant.

Previous History.—Measles and scarlet fever in childhood; "inflammation" of her "throat" 20 years ago; since then frequent "sore-throats"; peritonsillar abscess opened three years ago; frequent attacks of acute rhinitis and bronchitis; varicose veins in legs; all teeth extracted four years ago. Two children born dead at full term; no living children. Venereal disease denied.

Complaint.—Dyspnœa and palpitation on slight exertion.

Present Illness.—A year ago when running she had an attack of "palpitation" accompanied by dyspnœa. Since then she experienced several similar attacks on exertion. In October, 1926, she had acute bronchitis accompanied by palpitation and dyspnœa. She apparently recovered from the bronchitis, but the palpitation became progressively worse on exertion and recently appeared on even slight physical effort.

Physical Examination.—Pulse 166 and respirations 26 per minute. Temperature (mouth) 98·8° F. The pulse was regular with occasional dropped beats, and all cardiac systoles gave rise to a pulse at the wrist. The face, hands, and feet were cyanosed, and there was moderate dyspnœa at rest. The tonsils were hypertrophic and the submaxillary lymph-glands and the superficial cervical glands along the right sterno-mastoid were enlarged. Sibilant rhonchi were heard diffusely over the lungs and crepitations at the bases; there was impaired resonance and feeble breath sounds over both bases. The heart was enlarged to the left, the impulse being in the fifth intercostal space, 11·5 cm. from the middle line; a mitral systolic murmur was heard over the apex and transmitted to the left axilla; there was slight accentuation of the aortic second sound. There was slight œdema of the shins and ankles. The abdominal reflexes were absent. The blood pressure was 190/140. The right lobe of the thyroid gland was slightly enlarged and firm and could be palpated by Lahey's "dislocation" method; there was a fine tremor of the hands (rate about 4 to 6 per second). The urine contained no albumin, sugar, or casts. The patient was freely coughing up a moderate amount of mucoid sputum. There were no other abnormalities on clinical examination. Blood chemistry: Urea nitrogen, 11·6 mg.; non-protein nitrogen 20 mg., uric acid 3 mg., and creatinin 1·4 mg. per

100 c.cm. of blood. Urea-concentration test normal (2·3 per cent.). Fixation of specific gravity and water excretion tests indicated slight kidney deficiency. A provisional diagnosis was made of auricular flutter, myocardial failure, mitral incompetence, chronic bronchitis, and congestion of the bases of the lungs. The blood Wassermann reaction was + +. An electrocardiogram showed auricular flutter with 2 : 1 to 3 : 1 block (Fig. 8). The patient had been getting 5 minims of tincture of digitalis for ten days previously. After the tachycardia has been successfully treated the basal metabolic rate was found to be +32 per cent.; there were no hyperthyroid eye signs, and it was concluded that the right thyroid lobe probably contained a "toxic adenoma." Pressure over the vagi or eyeballs did not slow the pulse.

Treatment.—Between 12 midnight, Dec. 13th, and 1.30 A.M., Dec. 14th, 1·6 g. of digipuratum was given in divided doses. The pulse-rate remained at about 160 until 1.30 A.M. on Dec. 14th, when it suddenly fell to about 68 and was slightly irregular. An electrocardiogram taken on Dec. 14th at 11.30 A.M. showed auricular fibrillation (Fig. 9), the pulse-rate at this time being around 90 per minute. Several electrocardiograms were thereafter taken on Dec. 15th and 16th, and showed, generally, an increasing ventricular rate and auricular fibrillation. It was decided to endeavour to abolish the fibrillation and induce the return of sinus rhythm by the administration of quinidine. Accordingly 0·2 g. of quinidine sulphate was given orally at 12.10 P.M. on Dec. 16th; as there were no signs of idiosyncrasy, 0·4 g. was given at 3 P.M., 0·4 g. at 4 P.M., and 0·4 g. at 5.30 P.M. on the same day. At 6.5 P.M. an electrocardiogram showed that sinus rhythm had appeared with occasional ventricular extrasystoles (Fig. 10). Six hours later the extrasystoles became more frequent (about 1 in 5). A few hours after the appearance of auricular fibrillation and the slowing of the ventricular rate, the cyanosis and dyspnœa disappeared, and a little later the œdema vanished and the congestion of the pulmonary bases showed signs of clearing up; two days later the latter had completely disappeared, and on Dec. 19th the patient was able to walk about the ward without discomfort (she was kept in bed during the active treatment). She was discharged a few days later feeling quite well. Antisyphilitic and, indeed, any form of treatment was refused.

Up to June 1st, 1927, there was no return of flutter, but extrasystoles were present, varying from 1 in 3 to 1 in 10 (Fig. 11); the patient felt well and was able to take moderate exercise without discomfort. On June 17th, 1927, she returned complaining of dyspnœa and palpitation; there was cyanosis, slight œdema of the feet, and copious mucopurulent sputum; sonorous and sibilant rhonchi were heard over the lower lobes of both lungs, the resonance of which was diminished on percussion; temperature 97° F. (axilla), respirations 26, and pulse-rate 150 and regular; a mitral systolic high-pitched blowing murmur was heard and transmitted to the axilla; the cardiac impulse was located in the fifth intercostal space 13 cm. from the middle line. The patient was noticeably drowsy and apathetic. The blood pressure was 102/78. The electrocardiogram showed auricular flutter with 2 : 1 block. From 9.20 P.M., June 17th, to 12.30 P.M., June 19th, the patient received 2·1 g. digipuratum by mouth in divided doses, but, owing to occasional vomiting, which began 20 minutes after the first dose and continued irregularly throughout the administration of the digipuratum, it is impossible to know how much of the drug was absorbed. During this period the pulse-rate gradually slowed down; at 12.30 P.M., June 19th, it was fairly steady at 70 per minute and the electrocardiogram showed flutter with 3 : 1 to 4 : 1 block. On June 20th, after the patient had received the relatively large dose of 2·9 g. of digipuratum, auricular fibrillation appeared. An interesting additional arrhythmia now, however, appeared for the first time in addition to fibrillation; the patient exhibited attacks of tachycardia of 15 to 45 seconds' duration, the pulse-rate suddenly changing from about 86 to 150 per minute. It was difficult to get good tracings of the tachycardia owing to restlessness, but Fig. 12 illustrates the findings. Evidently this new arrhythmia was an example of the comparatively rare condition known as ventricular tachycardia. It is interpreted as such because (*a*) the auricles were fibrillating, and therefore it could not have an auricular origin; (*b*) because the ventricular complexes were distinctly abnormal in form; and (*c*) because of the presence of somewhat similar ectopic beats before (Fig. 11) and after (Fig. 13) the paroxysms.[4] It is probable that the attacks of tachycardia, which apparently arose from a focus in the left ventricle, were due to digitalis intoxication, because they became shorter and more infrequent from the cessation of digitalis therapy on June 20th and were no longer present on June 24th, when only occasional extrasystoles of similar form were seen. Fibrillation, however, persisted. It was now judged safe to give quinidine sulphate by mouth, and on June 24th 1·6 g. was given in divided doses. Two and three-quarters hours after the last dose of quinidine sinus rhythm was shown in the electrocardiogram with ventricular extrasystoles (Fig. 13). The pulse-rate next day was now about 80 and regular, the impulse 12 cm. from the middle line (fifth space), the mitral systolic murmur was still heard, and in addition to this a faint mitral murmur was heard in late diastole. The drowsiness, cyanosis, and dyspnœa had completely passed off and the patient was quite comfortable. She was discharged a few days afterwards on antisyphilitic treatment and taking 22 minims of tincture of digitalis per day. On Sept. 14th, 1927, sinus rhythm was still present with occasional extrasystoles arising, sometimes in the left and sometimes in the right ventricle; the P wave was normal in type and the pulse-rate was 88 per minute. The basal metabolic rate was +28 per cent., the diastolic murmur had disappeared, and the patient stated that she felt well. She was still taking digitalis, as prescribed above, on Dec. 6th, 1927, and flutter had not recurred.

This patient was placed under restraint on Dec. 18th, 1927, suffering from melancholia. She died in January, 1928, in mania, but her heart was reported as consistently normal by the physician in whose charge she was. An autopsy was not obtained.

Comment on Case 3.

Auricular flutter gave place to auricular fibrillation after digitalisation, and fibrillation, in its turn, was abolished by quinidine, sinus rhythm being restored. The case relapsed to flutter after six months and once again the same form of treatment was successful; on this occasion, however, paroxysmal ventricular tachycardia appeared as a toxic digitalis effect at a time when auricular fibrillation was present, and quinidine treatment, which was delayed four days until the ventricular tachycardia disappeared, was again successful in restoring sinus rhythm.

CASE 4.—Housewife aged 46. Admitted Jan. 19th, 1927, from county home in such a serious condition that no history was obtained. Heart-rate 216 per minute and regular, no murmurs heard; pulse could not be felt at the wrist; respirations 34 and temperature 96·2° F. (axilla). Cyanosis of hands, feet, and face; orthopnœa and dyspnœa. Blood pressure could not be read by auscultatory method. Impulse beat in anterior axillary line, liver edge felt 3 cm. below costal margin; loud rhonchi heard over thorax and moist crepitations heard at pulmonary bases. No œdema of legs. Electrocardiogram (Fig. 14) showed auricular flutter with 1 : 1 response—the ventricle responding to each circus movement in the auricle. Pressure over vagi or on eyeballs did not slow the pulse. A hundredth of a grain of strophanthin was given intravenously, after which the pulse temporarily returned to the wrist, but death occurred in two hours.

Permission for a complete autopsy was refused, so the heart alone was examined by Dr. A. R. J. Dungan. The right ventricle was markedly dilated, the myocardium being very much thinned out at the apex; posterior cusp of mitral valve was a little shortened and thickened, and aortic cusp of mitral valve had a thin ridge of minute organising vegetation along its line of closure; the root of the aorta had small patches of commencing atheroma and the coronary arteries showed similar changes, but so slight as to produce no narrowing. Sections showed some fatty degeneration of the muscle-fibres of the right auricle in the neighbourhood of the upper third of the sulcus terminalis, and a certain amount of hæmorrhage in its lower third.

In the vast majority of cases of auricular flutter there is some degree of A-V block, and only rarely do the ventricles respond to each auricular circus movement as in this patient. Only about 18 cases of flutter with 1 : 1 ventricular response are recorded.

CASE 5.—A business man, aged 60, was admitted on March 5th, 1928. Height, 5 ft. 11 in.; weight, 190 lb.

Complaint.—Breathless on exertion and slight swelling of the lower legs towards evening.

Previous History.—Smokes about 40 cigarettes a day; otherwise irrelevant.

Physical Examination.—Pulse-rate, 144; impulse beat, 9·5 cm. from middle line in fifth space. Only three teeth of his own and these show pyorrhœa and one is crowned. Moderate œdema of lower legs. Crepitations at both pulmonary bases. Blood pressure 112/92. The electrocardiogram shows auricular flutter with 2 : 1 block.

Treatment.—1·6 g. of digipuratum caused flutter to give place to auricular fibrillation in 28 hours; the digitalis was then stopped and normal sinus rhythm appeared four hours afterwards. The pulse-rate was then 56 per minute, the blood pressure 130/78, and the crepitations at the pulmonary bases and the œdema of the legs had disappeared. He was discharged on a daily dose of 20 minims of tincture of digitalis.

Twenty-two days later flutter had not recurred, the blood pressure is 142/76, the pulse-rate 72 per minute, and he feels and looks in good health in every respect. He has reduced his cigarettes to 16 per day and has promised to get the three teeth extracted.

Summary.

Five cases of auricular flutter are described. In the first case sinus rhythm appeared after an unknown interval following digitalis treatment, but relapse to flutter occurred later; adequate digitalis administration, however, caused the maintenance of 4 : 1 block between the fluttering auricles and the ventricles with the result that the circulation was quite efficiently carried on. In certain cases of flutter established for a considerable length of time, especially if associated with congestive heart failure, the possibility of the presence of auricular thrombi and of their detachment after the appearance of sinus rhythm should be considered. This consideration led us to believe that a combination of digitalis and quinidine treatment in this case might be inadvisable, especially as digitalis alone produced a degree of block which permitted of a sufficiently low ventricular rate. Eventually, however, and without quinidine, sinus rhythm reappeared while the patient was taking digitalis with no untoward results.

In the second and third cases digitalis in suitable dosage on each occasion caused flutter to be replaced by auricular fibrillation, which, in its turn, gave place to sinus rhythm as a result of treatment with quinidine. In the second case, although auricular fibrillation appeared after digitalis treatment, relapse to flutter occurred on discontinuance of the digitalis when quinidine was not used after fibrillation appeared, whilst quinidine alone in moderately large doses was unsuccessful in the treatment of flutter, but caused changes in the electrocardiograms which might be interpreted as evidence of toxic action. Each of the three relapses in the second case from sinus rhythm to flutter, as well as the first attack of flutter, was controlled by digitalis followed by quinidine; digitalis caused flutter to be replaced by fibrillation, and quinidine caused the latter to be replaced by sinus rhythm. A large dose of digitalis, however, was required on the second occasion to convert flutter to fibrillation. The two attacks of flutter in the third case were also successfully treated by digitalis followed by quinidine, but the large dose of digitalis given in the relapse caused transitory paroxysmal ventricular tachycardia.

Cases 1, 2, and 3 illustrate the tendency for auricular flutter to reappear after successful treatment.

The fourth case was an example of a comparatively rare condition; auricular flutter with 1 : 1 ventricular response.

In the fifth case flutter gave place to auricular fibrillation after digitalis and fibrillation was spontaneously replaced by sinus rhythm four hours afterwards.

Many cases of auricular flutter may be successfully treated by full digitalisation [5] with the object of inducing the appearance of auricular fibrillation; if then digitalis be stopped, normal sinus rhythm may replace fibrillation, as has been shown by Lewis. If sinus rhythm cannot be restored in this manner, fibrillation still persisting, it is suggested that the latter condition may be treated with quinidine with the object of restoring sinus rhythm. This procedure—digitalis followed by quinidine—was successful six times in two of the cases of flutter reported in this study.

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4. Robinson and Hermann: Heart, 1921, viii., 59.
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THE POSITION OF HISTOLOGY IN THE PROGNOSIS OF CARCINOMA OF THE BREAST.

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Cases of carcinoma of the breast are usually classified microscopically according to two standards; one method is by the arrangement of the cells, which may be in masses, in solid columns, or in tubules: the other is by the relative amounts of epithelial elements and fibrous tissue. Depending on the former grouping spheroidal-celled carcinomata and adenocarcinomata are described, whilst, with the latter standard, the designations "atrophic scirrhus," "scirrhus," and "medullary" or "encephaloid" are employed. Speaking generally, the prognostic value of these terms has been disappointing. Attempts have recently been made to put the subject on a more satisfactory basis. Greenough,[1] in America, and Delbet,[2] in France, have made extensive studies and published their conclusions. The former has applied the theory of dedifferentiation, used by Broders [3] in other regions, to carcinoma of the breast, and has analysed under nine headings the histological factors which may be of importance. He states, however, that "the pathological classification of these specimens rests upon the estimate of the individual observer and the weight he is inclined to give to a number of different factors." Delbet, on the other hand, rejects the theory of dedifferentiation, but recognises different morphological and physiological types of growth of varying degress of malignancy.

The histological picture, however, has been studied without due regard to the other features of the case which influence the prognosis. For example, however relatively innocent a tumour may appear under the microscope, the prognosis must be hopeless if, at the time of the operation, the disease has passed outside the field of surgical interference. On the contrary, the relative malignancy of a growth which has been completely removed when in the early or local stage is a matter of theoretical importance only. If, therefore, the histological appearance of the growth is to be of any value in giving a prognosis in an individual case, account must also be taken of the stage which the disease has reached when the patient presents herself for treatment. The best index of the degree of spread is afforded by examination of the axillary glands, the importance of which was first pointed out by Halsted and has more recently been elaborated in the Leeds figures of the Ministry of Health.[4]

Signs of Prognostic Value.

The present study was undertaken in an attempt to ascertain if there is any correlation between the histological appearance of the growth and the subsequent course of the disease, and to determine the value of such an analysis in giving a prognosis in an individual case when all the ascertainable factors have been taken into account.

Greenough's method of classification has been largely followed, but chief importance has been attached to three factors—tubule formation, inequality in size of nuclei, and hyperchromatism.

Tubule formation has been considered of favourable significance. Marked inequality in size and irregularity of outline of the nuclei has been taken to be indicative of a high degree of malignancy, and the presence of many hyperchromatic nuclei has also been considered to affect the prognosis adversely.

The amount of secretion and number of mitotic figures have been taken as qualifying the above, the former favourably and the latter unfavourably. Other

points, such as degeneration of cells, small round-celled infiltration, and hyalinisation of stroma have been noted, but little weight has been attached to them. Irregularity in size of cells has been considered together with irregularity in size of nuclei, but the estimation is often difficult owing to indistinct cell outline and difference due exclusively to mechanical influences. In the sections examined it has been noted whether each factor is absent, or present in slight, moderate, or marked degree. All points were then considered and the relative weight attached to each; the tumour was then placed in one of the following three groups:—

Group 1. Of slight degree of malignancy.
Group 2. Of moderate malignancy.
Group 3. Of marked malignancy.

In all cases the tumour was placed in the appropriate group before reference was made to the subsequent clinical history.

The following fallacies suggest themselves:—

(1) Different parts of the same tumour may show varying histological appearances. This should be guarded against by examining a sufficiently large portion, preferably cut from the periphery, where active growth is taking place. With this precaution the objection should not be valid, and, in fact, in those instances in which two different portions of the same tumour were available, both have always been placed in the same group.

(2) The histological appearances of metastases may differ widely from that of the primary growth, so that one should base the estimate of malignancy on sections from the primary growth alone.

The criteria of the degree of malignancy which have been adopted are, therefore, signs of rapidity of growth and of the extent of departure from the structure of the fully developed epithelium of the breast.

Material Investigated.

The present series consists of 50 cases, all of which were submitted to a radical operation between the years 1919–23 inclusive. The operations were performed in each case by the same surgeon, as it was thought that this would obviate discrepancies dependent on varying operative techniques. Only those cases were taken in which a sufficient clinical history was available and microscopical sections had been preserved, and in which the results were known up to the end of 1926. The minimum time since operation is therefore three years, and the maximum seven years. The records of cases during the war years were in many cases deficient, and the tracing of patients operated on before the war was found to present too many difficulties to be of value.

Results of Investigation.

If the cases are subdivided into groups according to the histological index of malignancy determined as above, there are:—

GROUP 1.—Slight histological malignancy, 16 cases.

Alive and well	11
Died of recurrence	2
Died following operation	1
Died of other causes	2

GROUP 2.—Moderate histological malignancy, 12 cases.

Alive and well	5
Died of recurrence	6
Died of other causes	1

GROUP 3.—Marked histological malignancy, 22 cases.

Alive and well	5
Died of recurrence	17

Thus there does appear to be a progressive deterioration in the results as the histological index of malignancy increases. This supports the conclusions of Greenough, who found:—

Group 1	68 per cent. of cases were cured.
Group 2	33 " " " "
Group 3	0 " " " "

The chief difference between the latter's figures and those recorded here is that, in the highest degree of malignancy he found no "cures," whereas in Group 3 of this series 5 cases out of 22 were alive and free from recurrence at the time of the investigation.

Since the above figures show that there is some relationship between the degree of malignancy estimated histologically and the subsequent course of the disease, it is next necessary to consider in what cases the criteria mentioned are of practical value in prognosis. To study this question the material has been subdivided into three tables (A, B, and C).

TABLE A.—*Cases Operated on before Axillary Involvement.*

Histological group.	Cases.	Alive and well.	Died of recurrence.	Died other causes.
1	8	7	0	1
2	4	4	0	0
3	5	5	0	0
Total	17	16	—	1

The analysis shows: (1) A relative preponderance of cases of slight or moderate malignancy. (2) A uniformly good result whatever the grade of malignancy. (The term "good result" is used in this paper as indicating the result within the time limits of the investigation.)

In other words, the less malignant a tumour the greater the chance that it will be treated in this early favourable stage, but should a more malignant tumour be operated upon adequately at this stage the result will be equally good.

In Table B are given advanced cases showing ulceration, fixity to pectoral fascia, adherent axillary glands, &c., in which operation was undertaken purely as a palliative measure.

TABLE B.—*Advanced Clinical Cases.*

Histological group.	Cases.	Alive and well.	Died of recurrence.	Died other causes.
1	3	1	2	0
2	3	0	2	1
3	9	0	9	0
Total	15	1	13	1

The analysis in this case shows: (1) A preponderance of cases of the higher grades of malignancy. (2) A practically uniformly fatal issue except in one patient with a low histological malignancy.

In other words, when this stage is reached the time for a "cure" has passed for the vast majority of cases, whatever the histological picture may be. Occasionally, however, as in one case in which a palliative operation three years after the tumour appeared was followed by three years of comfortable life, a low histological index may be associated with a more chronic course than would otherwise be expected.

So far, then, the histological features have not added much of value to the clinical data on which a prognosis is based, though demonstrating some facts of interest. It is in the intermediate type of case that they would be expected to be of greater value (Table C).

TABLE C.—*Intermediate Clinical between those of Tables A and B.*

Histological group.	Cases.	Alive and well.	Died of recurrence.	Died cause not known.
1	5	3	0	2
2	5	1	4	0
3	8	0	8	0
Total	18	4	12	2

The analysis shows: (1) That the only four cases known to be alive and well at the time of inquiry

HISTOLOGICAL CLASSIFICATION OF BREAST TUMOURS.

Group I.—Slight Malignancy.

FIG. 1.

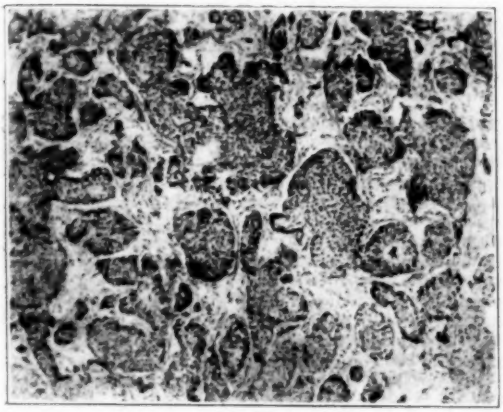
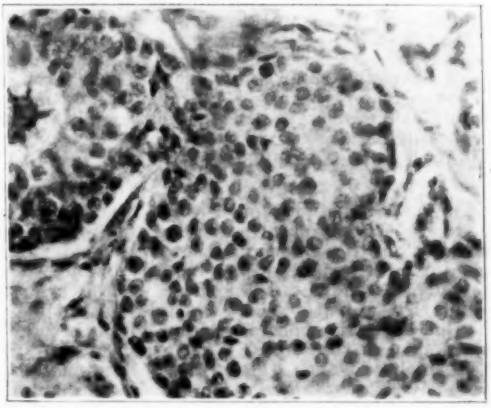


FIG. 2.



Tubule formation; cells even in size and staining.

Group II.—Moderate Malignancy.

FIG. 3.

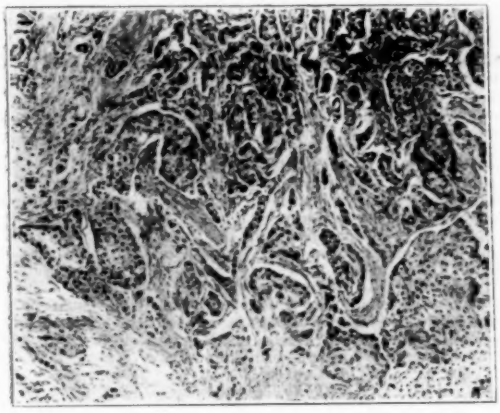
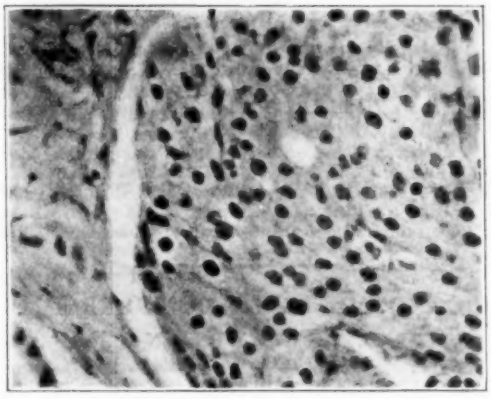


FIG. 4.



Absence of tubule formation; cells slightly uneven in size and staining.

Group III.—Marked Malignancy.

FIG. 5.

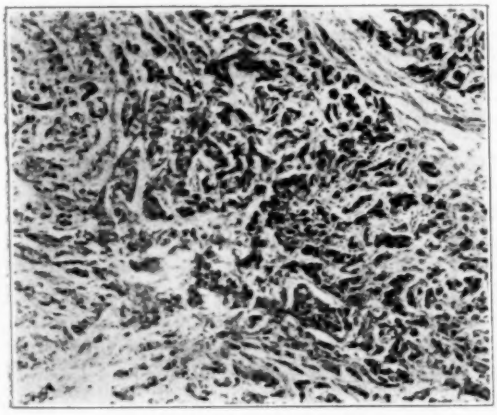
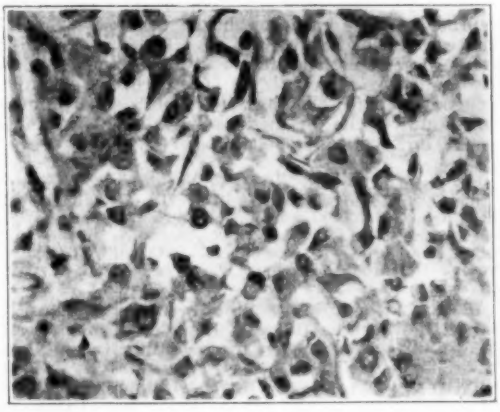


FIG. 6.



Irregularity of growth; absence of tubule formation; cells markedly uneven in size and staining.

These plates are given as examples of the groups into which the breast tumours have been classified.

belonged to the lesser groups of malignancy. (2) That all the cases of high malignancy died of the disease.

If, therefore, one should operate on a patient in whom axillary involvement is early, a favourable histological picture is of definite prognostic importance. A case not included in this series has recently been studied and illustrates the opposite feature. This patient had a small breast tumour with very early axillary involvement. Shortly after operation recurrence developed, and death ensued 18 months later. The rapidly unfavourable result was difficult to explain on clinical grounds, but became more explicable when it was discovered that microscopically the tumour was of a high degree of malignancy.

Conclusions.

The present study, even when due allowance is made for the comparatively small number of cases, in addition to confirming the prognostic value of microscopical examination of the axillary glands, corroborates the results of those workers who have found that there is a definite relationship between the histological appearance and clinical course of carcinoma of the breast. This relationship shows itself in three ways: (1) In cases of low malignancy the early or favourable stage is of longer duration, and patients are more likely to present themselves for treatment before there has been much spread of the disease. (2) In advanced cases palliative operation tends to be followed by more prolonged benefit if the histological index is low. (3) Histological estimation of the degree of malignancy is of value in prognosis in a limited number of intermediate cases—i.e., those in whom axillary involvement is early.

We wish to express our indebtedness to Mr. Sampson Handley, surgeon to the Middlesex Hospital, and to Prof. James McIntosh, director of the Bland-Sutton Institute of Pathology, for direction and assistance in this work.

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PROGNOSTIC TESTS IN TUBERCULOSIS.

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THE object of this work was to investigate the value of certain tests applied to pulmonary tuberculosis. The comparative facility with which the stage and progress of the disease can be estimated in so-called "surgical" tuberculosis suggested that a large number of such cases might be used to standardise the tests. The following were selected: (1) a modification of Erhlich's diazo-reaction, called the urochromogen reaction; (2) the Arneth[1] count of lecucocytes; (3) the degree of cutaneous pigmentation; and (4) the quantitative von Pirquet cutaneous test. The urochromogen reaction (U R.) was described by Weiss[3] in 1911.

Into each of two test-tubes is put 1 c.cm. of urine, and 2 c.cm. of distilled water are added. To one tube are added three drops of 1/1000 solution of potassium permanganate, and the mixture is shaken. The presence of the faintest yellow (compared with the control) is taken to indicate the presence of urochromogen. The test is read as positive only when the mixture remains clear.

In comparision with similar tests, this has been found the most useful and delicate.[4 5 6] With a few exceptions[7] it has been applied only in pulmonary tuberculosis.

The cases investigated in the following series were all children under the age of 16. Their tuberculous lesions were non-pulmonary, and they were in-patients at the Liverpool Open-air Hospital at Leasowe. They were examined clinically every month as a routine, and more frequently if indicated. The urines were tested for urochromogen once every month, and if positive were tested every week or fortnight. It was found useful to have a second control consisting of normal urine, and in the majority of cases the proportion of urine to water was increased. It is essential that the potassium permanganate solution be freshly prepared. The test must be done in daylight, as slight colour changes are not apparent in electric light. The degree of intensity of the reaction was judged by the naked eye. For the purposes of comparison, urines from 152 cases in the medical and surgical wards of a general hospital were tested for urochromogen. Two gave a positive reaction, one a case of pneumonia, the other a case of diabetes mellitus. The reaction was proved to be independent of common abnormalities in urine. The work of Addis[8] in connexion with blood pigments suggested that urobilinogen might be responsible for the colour change. This was disproved.*

Recent investigations have suggested that there is some connexion between the urochromogen test and the van den Bergh reaction.

At Leasowe 360 cases were followed for periods of four to ten months. Thirty-six had a constantly positive reaction. Of these 22 have died within two years of the investigations; the recovery of 10 others is extremely doubtful, and the remaining 4 are undecided. In a year there were 12 deaths. Of these 7 had had a constantly positive U.R.; in 2 others the reaction had turned from negative to positive. The remaining 3 were proved, post mortem, to be non-tuberculous. One with extreme cachexia was thought to be suffering from miliary tuberculosis, and the absence of a positive reaction was inexplicable until the autopsy, when death was found to be due to diffuse sarcoma of the abdomen, the primary lesion being in the ovary. Eighteen cases out of 360 gave a positive reaction of slight degree and of short duration. In 6 of them a definite exacerbation of the disease was demonstrated, although in none did a change in the general condition occur. In 11 cases the reaction changed from positive to negative. In 2 others there was a marked decrease in the intensity of the reaction. In all of these there has been considerable improvement in general condition, and in 8 an arrest of the local disease. In 2 old-standing cases the improvement in general condition was in advance of the decrease in positivity. Eight cases changed from negative to positive, and in all these the change was followed by a decline in general condition and either the appearance of a fresh focus or an increase of the original one. In most of them the change in the reaction preceded the other manifestations by about a month. The rest of the 360 were all negative. Of these 4 seemed to have advanced and severe tuberculosis, but a good prognosis was given and they have since improved enormously.

Blood Films.

In examining the blood in films, an ordinary differential white count was combined with an Arneth count of the polymorphonuclear leucocytes. Some preliminary work was done with a view to forming a standard interpretation of the number of the lobes. 120 blood films were examined. In ten cases films were taken every month, concurrently with the urines. A few normal children were used as controls. In the hopeless cases—e.g., those with amyloid disease—the average count was:—

(1)	(2)	(3)	(4)	(5)
40%	39%	16%	5%	0%

Arneth index† = 87.

In those cases quiescent, or nearly so, the average count was:—

(1)	(2)	(3)	(4)	(5)
6%	33%	43%	16%	2%

Arneth index = 60·5.

The average count in the controls was:—

(1)	(2)	(3)	(4)	(5)
4%	34%	41%	19%	2%

* Thirty urines giving a positive U.R. were tested for urobilinogen (Schlesinger's test). Three gave a positive reaction. All the urochromogen was converted to urochrome (excess of potassium permanganate), which normally occurs in urine, and the test for urobilinogen was still positive. Two of the urines which gave a negative U.R. gave a positive urobilinogen reaction.

† Arneth index is obtained from the formula:—

(1) plus (2) plus $\left(\frac{3}{2}\right)$.

Of the cases taken monthly, four showed marked clinical improvement, reflected in the blood picture by a gradual move to the right. In very bad cases there were practically no eosinophil cells; in the quiescent cases there was a normal or high percentage. In the cases improving rapidly there was an eosinophilia of 6 per cent. to 8 per cent. The eosinophilia will be the subject of a separate communication.

Pirquet Skin Reaction.

An endeavour was made to demonstrate any relation there might be between the activity of the disease and the rapidity and intensity of the reaction. The technique described by McNeil [11] was modified slightly. Koch tuberculin A (undiluted), human and bovine, were used with normal horse serum as a control. The reactions were watched for three weeks, and 200 Pirquet tests were done. There were 12 negative results (tests repeated). All cases giving a positive reaction with human T.A. were positive with bovine. Four that were negative with human gave a positive with bovine. A positive may be read in any time from a few minutes to a few days. A negative can only be decided by waiting three or four days. A reaction to the horse serum always disappears within five days. The stage or severity of the disease was found to bear no relation to the intensity, duration, or rapidity of the reaction. Even a child giving a negative result is more or less a clinical curiosity.

Pigmentation.

Rollier [2] and others [14] have pointed out the connexion between quiescence of disease and the pigmentation of the skin in response to heliotherapy. It was found in this series that cases with severe and progressive lesions did not form pigment, and these (sandy hair and freckled type) had poor resisting powers. Favourable and quiescent cases became very brown, but a few of them subsequently relapsed. Cases with amyloid changes show a dislike and intolerance for sunlight, just as do the cases of congenital hæmatoporphyrinuria mentioned by Garrod.[9]

The intolerance of light by children with amyloid disease is confirmed by the work of J. V. Supniewski (*Journal of Physiology*, 1927, lxiv., 30), who investigated the action of physical light on organs sensitised by hæmatoporphyrin. He found that the heart, intestines, and uterus went into tonic contractions. There was a rise of blood pressure and death.

Conclusions.

It was definitely concluded that none of these tests is sufficiently delicate to differentiate between a case in which the disease is mild but active and one in which it is quiescent.

It was decided that although pigmentation is a favourable sign, it is no guarantee of inactivity.

The severity, rapidity of onset, and duration of a standardised Pirquet cutaneous reaction do not bear any relation to the severity or stage of the disease.

There is a gradual return to a normal Arneth count as a lesion becomes quiescent. There is a tendency towards normal after heliotherapy and a reversion during the winter months.

The relative percentage of lymphocytes has not been found to have any significance.‡ The presence of eosinophil cells in more than 3 per cent. or 4 per cent. is a favourable sign.

The urochromogen reaction is always present in severe cases or in late stages of the disease, when the variation in the intensity of the reaction is of value in prognosis. Its absence in an apparently severe case is a reliable indication that the defences of the body are adequate for the time. Its presence in an apparently mild or quiescent case is a very valuable indication that the disease is progressing and that the defences of the body are inadequate. Its appearance for a short time during the acute stage is not of serious import.

‡ That is to say that, in this series, the relative percentage of lymphocytes (large and small) was of no value in differentiating cases with regard to the stage of the disease (see table).

—	Urochromogen reaction.							Blood films.		
	Cases.	Always negative.	Occasionally positive.	Positive becoming negative.	Negative becoming positive.	Always positive.	Deaths.	Cases.	Average (*a*) eosinoph., (*b*) lymph. count.	Average Arneth index.
(A)	11	100%	0	0	0	0	1	5	(*a*) 1·5% (*b*) 26·5	58·5
(B)	57	100%	0	0	0	0	—	11	(*a*) 5·0 (*b*) 30·0	60·5
(C)	222	207 (93%)	15 (7%)	0	0	0	1	11	(*a*) 4·4 (*b*) 31·7	63·2
(D)	17	—	1	0	8	8	3	6	(*a*) 2·1 (*b*) 35·2	67·1–79·6
(E)	26	7	2	11†	0	4	—	8	(*a*) 2·5–6·2 (*b*) 32·6	81·7–62·0
(F)	25	1*	0	0	0	24	19	8	(*a*) 1·5 (*b*) 28·5	87·0

Clinical conditions: (A) Non-tuberculous. (B) Quiescent. (C) Active but uncomplicated and favourable. (D) Favourable cases becoming complicated. (E) Serious cases showing marked improvement. (F) Persistently serious cases.

* Non. T.B. † Two less +ve.

The conclusions of previous workers have been confirmed, except when they say [4] that cases which show a persistent positive reaction in spite of treatment have a hopeless prognosis. Five cases had a positive U.R. for seven months at least, but they have since improved and the test has become negative. Dehoff's statement, that it is of use to a surgeon whose beds are limited in selecting cases for treatment, has not been confirmed, as a single positive reaction is of no value. It would be unwise to reject a case as hopeless on such grounds; the test would be of more value to a surgeon supervising cases discharged as quiescent, for the appearance of positive U.R. nearly always precedes any appreciable change in clinical condition.

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EXTENSION OF CHARING CROSS HOSPITAL.—At the annual general meeting it was stated that the hospital has now not only obtained possession of the adjoining premises of the Royal Westminster Ophthalmic Hospital, but has obtained them free from debt, the generosity of the public having provided the £70,000 required. A further £30,000 has yet to be raised for the equipment of the new premises, and it is desired to buy a site for a nurses' hostel.

STREET ACCIDENTS AT NORWICH.—The annual report of the Norfolk and Norwich Hospital states that the recent extensions have proved insufficient to meet the demands. A serious contributory cause of the failure is the large number of street accident cases. On one occasion during the past year there were 32 motor accident cases in the wards. The average length of stay of these 32 patients was 86 days, whereas the average length of stay of all patients was only 21 days. There has consequently been a very large increase in the waiting list.

THE INJECTION TREATMENT OF VARICOSE VEINS.

AN ESTIMATE OF ITS PLACE IN PRACTICE.

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THERE are few conditions more commonly seen in a surgical out-patient department than varicose veins, which handicap a large section of the adult population by the pain and disability which they cause. Surgical excision is time-honoured but time-consuming; its application is limited and its results uncertain, while dangerous complications are by no means rare. The authors of this paper have read with interest the writings of Sicard,[2] Meisen,[3 4] and Douthwaite,[1] and have applied their methods in several hundreds of cases. The aim of this article is not to deal exhaustively with the subject, but to set forth in essential detail those applications of the method of varicose vein injection which undoubtedly relieve the patient. While the authors acknowledge the debt they owe to the pioneers in this field, it is their intention to set forth only those facts which have been abundantly demonstrated in their own practice.

Solutions Used.

In this series the two following solutions alone were used:—

1. Sodium salicylate, 25 per cent. } in equal parts.
   Sodium chloride, 10 per cent. }
2. Quinine bihydrochloride (or hydrochloride), 4 g.
   Urethane, 2 g.
   Distilled water to 30 c.cm.

These solutions must be freshly prepared and sterile. Should the quinine have crystallised out, the solution must be raised to boiling-point in a water-bath before use. Ampoule preparations are not recommended as it is doubtful whether they will keep. The best container for the solution is a conical glass flask plugged with wool, or a glass-stoppered bottle.

It is difficult to choose between the quinine and the salicylate solutions; in fact, some patients may best be treated by the injection of one drug in one part of the limb and the other in another part. In general, we recommend the sodium salicylate when the veins are large and covered with healthy skin. The quinine-urethane is the less powerful venous obliterant, but is advisable when the veins are small, the patient apprehensive, or the operator gaining experience.

Technique.

The injection operation must combine simplicity with strict asepsis. It is carried out as follows.

The patient is seated on a gynæcological chair or on an ordinary operating table, one end of which is raised as a back rest and the other allowed to hang down behind the patient's dependent legs. The feet may rest upon a stool. In this position the knees are bent at about a right angle and the whole lower extremities are abducted about 40 degrees. When the veins are situated posteriorly the patient stands upon a broad-based stool. In front of him is an assistant upon whose shoulders he leans for support. The operator sits behind him on a low chair. Should the patient feel faint—which is possible, but rare—the assistant can support him and help him to lie down.

The skin is cleansed with spirit; no coloured antiseptic can be used as it would mask the veins. The area of operation is isolated with sterile towels. A tourniquet is unnecessary, painful, difficult to handle, and increases the bleeding by augmenting venous congestion.

The injection is made with a 5 c.cm. Record syringe to which is fitted a fine hypodermic needle; both are sterilised overnight in spirit and are rinsed in sterile water before use. The needle of the charged syringe is inserted through sound skin and pushed on through healthy tissues for a centimetre. It is never allowed to pierce the vein directly; the point must always traverse sound skin and healthy connective tissue before entering the vein. In this way a valve-like puncture is produced, and post-operative backflow extravasation is rendered unlikely. It is this backflow which produces post-operative pain, discoloration, and patches of necrosis leading to ulceration.

The next step is for the operator to satisfy himself beyond any doubt whatever that the point of the needle is actually within the lumen of a vein. When blood appears in the syringe on withdrawing the plunger the injection is proceeded with. The fluid should be injected at the rate of 1 c.cm. in 5 seconds. A faster rate may cause painful spasm or even rupture of the vein. If pain is caused the needle is withdrawn and inserted at another point. As a general rule the injection is made in the direction of the blood flow, which is from the trunk toward the extremities when the limbs are vertical. The amount of fluid introduced at each puncture varies from ½ to 5 c.cm. according to the size of the vein. Not more than 15 c.cm. should be given at one sitting. As a rule, three sittings are necessary for each patient; fewer may suffice to produce thrombosis in small varices, and more may be necessary for very large tortuous veins involving a whole limb.

A piece of adhesive strapping the size of a postage stamp seals the puncture when the needle is withdrawn. If several punctures have been made, a crêpe bandage or a flannel bandage cut on the bias is applied, to give comfort, protection, and support.

After the operation the patient is encouraged to walk about the room and advised to continue his usual occupations, although violent exercise should be avoided for a week. Post-operative elevation of the limb is definitely contra-indicated.

Results and Effects.

The general effect is most gratifying in the majority of patients. Often they are so pleased that they want to have more injections at once, although prudence advises the operator to wait for the results of the first treatment before proceeding. The increased sense of well-being is especially marked in women whose handicap has been so great as to make them do as much of their housework as possible sitting down with their legs up. Most of those treated have returned to work and continued in active occupations.

Among the general ill-effects noted in this series are giddiness, fainting, tinnitus and, in women, general abdominal pain, especially after quinine.

After a successful injection the vein sometimes dilates, but usually contracts and loses its blue colour immediately. An hour later it is once again prominent. On the succeeding day it is hard and thrombosed to an extent which varies directly with the amount of solution injected. There may be a feeling of fullness, but this passes off on walking about. The limb may be stiff for a few days, but this, like the cramp and joint pains of which patients often complain, passes off. The limb diminishes in size and its natural contour is restored, and after six months only the fibrous strands of the veins remain. These strands are most easily felt and persist longest over the subcutaneous surface of the tibia; they disappear rapidly where they are supported by muscle, as in the calf.

Some patients complain of a burning sensation at the time of injection; the solution—especially sodium salicylate—must not be injected too forcibly or pain and severe cramp may result. Fully half the patients complained of tenderness of the limbs for several days after operation. This is no doubt due to a mild inflammation concurrent with obliteration of the lumen. About 10 per cent. of patients showed discoloration or pigmentation round the area of injection. This may take months to disappear, and is probably due to perivenous leakage as it occurred most commonly in those cases which bled at the time of injection.

Complications.

Complications are generally due to neglect of the technique described in this paper—e.g., faulty preparation of the solution or lack of ordinary aseptic and antiseptic precautions.

In this series the only cause of failure was non-entry of the fluid into a vein, which may lead to discoloration, inflammation, or actual ulceration (two cases in our series). The technique of perivascular injection has been described by some writers,

but the authors do not recommend it, except for minute skin varices.

Mild degrees of shock and collapse are fortunately uncommon, but need mention. Douthwaite and others have suggested that this important complication may be avoided by previously testing the patient with small injections.

Embolism is exceedingly rare, although one fatal case has been recorded by Olsen.[7] It is far more frequent after surgical excision.

Acute septic phlebitis, acute cellulitis, and acute local suppuration have all been recorded and are presumably due to an infection at the time of operation. Ulceration and local gangrene may result from extravasation of the fluid, and there may be an extension of an existing eczema.

Contra-indications.

Quinine is contra-indicated in pregnancy, owing to the risk of abortion, and causes hypogastric pain and faintness during menstruation. Injection treatment has no place in advanced renal, cardiac, or pulmonary disease, nor when there is obvious high blood pressure. It is contra-indicated by deep thrombosis in the leg, which may be suspected if one leg is larger than the other, or if there is constant œdema or a history of deep lymphatic thrombosis or of acute white leg after pregnancy or typhoid fever. Acute septic thrombo-phlebitis of the superficial veins at the time of examination would negative injection treatment until the inflammation had subsided. Idiosyncrasy to quinine or salicylate must be kept in mind.

Varicose Ulcers.

There is no specific cure for varicose ulceration, and some patients respond to one treatment and some to another, while a few remain intractable to all. These latter suffer from ill-health, poor physique, and low resistance. The technique followed by the authors of this paper is as follows:—

> The ulcer is first cleaned up with fomentations or hypochlorite dressings. If the patient can afford the time he is kept in bed until the ulcers have healed and the veins are then injected, but if not the two remedies are applied simultaneously. Patients who insist on continuing their work can often be successfully treated as ambulants.
>
> The secret of success lies in the four words: Unna's paste properly applied. The patient is seated, with the leg horizontal and the feet on a stool. Unna's paste warmed to the consistency of cream is painted in a 3-inch zone around but not over the ulcer. A book-muslin bandage soaked in water is then applied from the toes to the knee and painted over with the paste. A second bandage is then applied and painted and the two are covered with a flannel bandage cut on the bias to conform to the contour of the leg. After ten days the paste stocking is removed, and the ulcer will be seen to be healing. The veins are injected at this stage and another Unna's paste bandage applied. From this time the cure of the veins and that of the ulcer go hand in hand.

Skin-grafting after excision has been used with success for small ulcers. Strapping the leg from ankle to knee with zinc oxide plaster in overlapping strips is sometimes useful; the strapping is placed directly on the surface of the ulcer. The authors do not recommend X rays or ultra-violet rays, nor have they found endocrines or calcium chloride of much value. No success has followed infiltration of the base and edge of the ulcer with quinine. When the patient has a positive Wassermann reaction the arsenical injections may well be given into veins adjacent to the ulcer.

Conclusions.

The aim of this paper is to encourage others to apply a method, the value of which has been so well proved in clinical practice as to make it the treatment of election. It is simple, inexpensive, time-saving, and comparatively free from complications. Its value to the State is shown by the reduction it could effect in disability under the National Health Insurance Act and in rendering candidates eligible for the Services. Its value to the individual is demonstrated by the appreciation of those on whom it has been used. Recurrence does not occur, at any rate within the three years' experience on which this paper is based.

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Clinical and Laboratory Notes.

A NOTE ON CUTANEOUS AND VISUAL HALLUCINATIONS IN THE CHRONIC HALLUCINATORY PSYCHOSIS.

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HALLUCINATIONS as is implied in the name of this syndrome constitute its most outstanding characteristic. They are obsessive, compulsive, and lasting. Patients do not, except possibly in the earliest stages, recognise the hallucinations as due to the morbid states of their own minds. The symptoms, by reason of their unpleasant nature and the fatiguing conduct which they occasion, are followed in some persons by mental obfuscation and slight confusion. Beyond this there is little or no mental disorder, and patients remain of normal affections, properly orientated, of good powers of judgment, choice and reaction in such affairs as are apart from their hallucinations. The annoyance caused is not set down to the persecution of enemies. Patients present, so far as can be discovered, no signs of toxic or endocrine disorder.

The hallucinations as described in literature are auditory and I have nowhere found accounts of other sorts. I propose to give in the following abstracts of notes instances of cases in which hallucinations have been first cutaneous and secondly visual.

Description of Five Cases.

CASE 1.—A. B., aged 60, single. This patient was first seen in July, 1921. She complained of things moving about the skin and that "black things came out of the skin." She produced a pill-box containing cotton, fluff, and debris said to have come out of the skin. The feelings were constant and interfered much with sleep. She spent much time hunting for "the things" in her bed and, having captured them, she placed them in water, where she saw them wriggle. This state of affairs had lasted for years. She displayed some signs of anxiety. Her look was one of constant worry. She occasionally caught at her breath and complained of suffocating feelings. She asked if the things on the skin were alive and if they could be given to other people. Her history revealed nothing relevant. The skin showed no lesion except a few marks of scratching. From July, 1921, till January, 1924, the patient did not attend. She then said that at night she had to rub her skin and that black things thereupon came from it. The things had wings. The next attendance was in February, 1927, when she brought a box containing small feathers and bits of thread, which she said had come out of her skin.

In September, 1927, she complained that lumps came out on her face, and that microbes which she could seize ran over it. Her clothes, she said, were full of black insects. She brought with her some tea-leaves which she said came from her skin after the applications of lotion. No amount of argumentation or demonstration could shake the patient's belief as to the truth of her allegations.

CASE 2.—C. D., aged 61, single. First attended in May, 1927. Complained of irritation and rash of the scalp and upper part of the body. Insects about the size of a flea walked under her skin and came out from it. Nobody except herself saw them. They were first noticed three years before. The patient spends many hours each day attending to herself, "rubbing the skin with bread-crumbs to bring out a rash." She gets up at night to look for insects. She ceased work a year ago in consequence of her condition. There is a slight degree of dermatitis, apparently due to the over-vigorous treatment applied to herself by the patient. There is no relevant personal or family history. She cannot be persuaded that there are no insects about her.

CASE 3.—E. F., aged 64, married. First attended in June, 1927. She said that for four months before she had on four successive days washed and brushed her dog, who had lice. Through doing this she had got lice herself. She has since then seen little tiny black things over her face, which constantly irritate her by crawling about. Ever since she has daily washed her clothes with chloride of lime and herself in sulphur baths. The dog and cat have been killed. There was nothing abnormal to be seen and she could not be persuaded that she had no parasites. There was no relevant personal or family history. At later attendances she said she was a little better and had not seen so many insects. She still felt them and, about the middle of the day, "they came like a swarm."

CASE 4.—G. H., aged 44, single. First attended in July, 1927. In 1922 she had taken some children to a circus and "one of them afterwards got some lumps." The patient then began to notice tiny black things, like powder, in the bed, and on rubbing her skin with ointment, tiny things came out of it. In a hot bath she feels an intense pricking sensation, and on rubbing herself "hears things clicking." She thought she had infected other people, including her sister and the maids in a house where she had been staying. In consequence of her condition she has done no work for about 18 months. She was convinced as to the reality of the existence of a parasite.

CASE 5.—I. J., aged 42, single. This patient is a sister of G. H. Her symptoms began four years ago and after the commencement of the disease in the sister. She attributes her sister's affection to her having slept in a bed which had been occupied by a man who had died of a tropical disease. She says that the sister's affection commenced a year after this occurrence. Extracts from the patient's written description run as follows: "Irritation everywhere and burrows or bites . . . we had to cut our hair off six months ago on account of a tiny black-and-white insect fine as dust that infected the head and sprang into the eyes, nostrils and ears from the hair. . . . I sometimes noticed a brown linseed-like thing that split open and had a thread hanging out. My ears were in a terrible state of pain where they had been burrowed some time back . . . the head seems to be the most infected with this trouble. One feels things too small to be seen flick all over us." No skin lesion or parasites were to be seen, but the patient could not be convinced that this was the case. There was no relevant personal or family history.

Commentary.

In these cases commonplace itching seems definitely to have preceded the morbid mental state and to have unduly excited and riveted attention. To explain the sensation, the reputed ways of parasites are remembered and fastened on by a mental disposition of a hypochondriacal type, just as in other hypochondriacal states banal abnormal feelings, such as flatulence or palpitations, are attended to and made much of. With heightened attention comes imagination awaiting the realisation of that which is expected. Talk about cutaneous parasites, or something read about them, is remembered and the imagination gradually materialises itself in the outside world. Material from sebaceous glands, bits of fluff, hairs, crumbs, tea-leaves, etc., become in the patient's mind parasites, and are endowed with particular properties and at length are seen to move. Perceptual processes involve the exercise of mental functions, such as the affections, selection from the environment of particular objects for attention, memory for purposes of comparison, imagination, reasoning, usually implicit, but occasionally explicit, and due balance between these functions. Text-book definitions of abnormal perceptual processes, though useful, suggest too hard and fast a differentiation from delusions. Hallucinations involve errors in processes of judgment and reasoning. If perception may be regarded as the intellectualisation of sensation or, more colloquially, the thoughtification of things, the error may be held to be of a delusional character probably arising from the vitiation of the perceptual processes by some strong uncoördinated affect, manifesting itself in the perceptual rather than the conceptual field.

Owing to the firm belief of patients in the existence of their parasites, various lines of conduct are adopted. Patients tend to withdraw themselves from contact with others, and some reach a stage of almost complete seclusion. Washing, scrubbing, fine-combing, and picking may be carried on till the patient is exhausted, and may reach a point at which dermatitis is caused.

Treatment is unsatisfactory since all that patients desire is some agent which will kill the parasites. They do not agree with the physician that psychological treatment is necessary. It is nevertheless curious that such patients remain content to attend an out-patient department for psychological medicine, as if there was some slight glimmering at the back of their minds that their trouble is "nervous." G. H. and I. J. show that rare phenomenon *folie à deux*. I. J., as the story runs, was infected by G. H., and at any rate shows her hallucinatory ideas and ways of re-acting to the supposed situations.

A NOTE ON CAMPTOCORMIA.

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CAMPTOCORMIA is a neurosis occasionally seen in civil life. It was relatively common during the late war, especially among the Latin races, and there is an abundant French and Italian literature. The malady is the assumption of a gait and posture described by Hurst as resembling that of a stage octogenarian. The body is bent forward at the hips; the shoulders are braced backwards; the head is lifted by extension of the cervical spine. The patient peers upwards and forwards, grinning with fatuity. There are concomitent functional coarse tremors of the head and arms and shaky weakness of the legs with slight knee flexion. On getting the patient to repose on a flat table, both the dorsilumbar flexion and the cervical extension disappear.

This curious malady was described fully by the French neurologists, Joltrain and Souques, in the early part of the war. It was rediscovered again and again by French, Italian, British, and American war neurologists, and among the best accounts is that of Hall. Joltrain's original case was that of a soldier who was buried by earth and debris, so that he experienced acute flexion of his whole spine, partly from "ducking" and partly from debris falling on his back. He was extricated in a terrified condition and was found to be unable to straighten his back. He remained in the hunched-up position for two and a half days, at the end of which time a functional paraplegia suddenly appeared. There was no organic, nervous, or bony disease and treatment restored him to normalcy. Joltrain likened the posture of dorsal flexion with an alert peering head extension to that of a gamekeeper's dog.

From about 50 case records since Joltrain's original paper it is clear that the ætiology varies widely. Trauma to the spine directly or indirectly, emotional shock, and long-standing exhausting fevers all seem capable of provoking the malady. Anon set in a workman after an accident is described by Hurst as "not very rare." The patients are of neurotic stock and there is no organic disease.

One form of treatment was described by Hall. The patient is stretched out on a flat board like a butterfly on a show-card and kept in that position for about 18 hours of the 24. He is securely fastened, and board and patient are bodily moved about from time to time in various planes. A good deal of the 18 hours is at first spent in the prone position, but gradually more and more time is spent in the vertical position. Muscle re-education and massage are carried out at intervals. To get the patient on to his board or frame in the first place an anæsthetic may be necessary. A totally different treatment, by psycho-analysis, was carried out in many war cases by Mme. Rosanoff-Saloff in association with Souques. The prognosis as to complete rehabilitation of the patient would seem to be very good, but many months may be required.

FIG. 1 (Case 1).

I am indebted to Dr. le Fleming Burrow and Dr. William MacAdam, of the honorary staff of the General Infirmary at Leeds, for permission to record the following cases:—

CASE 1.—R. B., aged 35. Is a miner in a poor district, oppressed by vicissitudes. He was first seen in October, 1927, and Fig. 1 is reproduced from a photograph taken at that time. He waddled into the out-patient department smiling happily, but with his trunk heavily flexed forwards. He explained that he was "always a nervous chap," and had been invalided out of the army for shell-shock in 1917. His reason for seeking advice was a diffuse backache, and particularly inability to "straighten out." The disability was of 12 months' duration and followed a long and severe attack of influenza. He had had no injury. He complained of difficulty in walking on account of his backache and flexion, but he gave his history with happy zest. The site of the pain was mostly in the lumbar column, and palpation there caused immediate full spinal extension with quick resumption of the bent forward attitude after a few seconds. He took up a prone position on a couch quite gaily and easily, and when the examination was finished he jumped briskly to the ground. General and radiological examination was quite negative for organic disease, and re-education by various methods brought about relief.

FIG. 2 (Case 2).

CASE 2.—K. S., aged 32. Described himself as "neurasthenic for years." Had suffered from shell-shock. In April, 1927, he fell ten feet from a scaffold and "landed" on his back. He was in bed for 14 days on account of pain and bruising. On getting up he found himself unable to "straighten out." A radiological examination and general physical examination did not disclose organic disease. He conformed very closely to Hurst's description of the "soldier walking painfully and slowly with the aid of two sticks, bending far forwards, his arms and legs often shaking with the effort, for all the world like a stage octogenarian." Fig. 2 is from a photograph taken at the time, but the blissful grin cannot be reproduced, in deference to the patient's wishes. He is getting better under a régime modified from that of Hall.

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Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF ORTHOPÆDICS.

A MEETING of this Section was held on April 3rd, with Mr. W. ROWLEY BRISTOW, the President, in the chair, to discuss the

OPERATIVE TREATMENT OF RECENT FRACTURES OF BONE.

Dr. CHARLES SCUDDER (Boston, U.S.A.) read the opening paper. He said that the subject was important for several reasons. The whole patient was damaged, as well as the bone; it was necessary to decide immediately on the course of treatment to be applied throughout, and unsatisfactory traditional and detached ideas of fracture treatment were very generally prevalent. Again, the initial treatment might stupendously affect the subsequent course of events and every general practitioner could understand and apply a simple, effective, primary treatment. The standard of result set 30 years ago was unsatisfactory to-day to the patient, his family, his employer, and the insurance agent. Moreover, the type of fracture had changed. There were more multiple fractures, more complicated joint involvements, and greater damage to bones and soft parts. The annual loss to industry from badly treated fractures was estimated at millions of dollars. The operative treatment of fractures, resting as it did upon the principles evolved by Lister, stood to-day on a fundamentally sound basis. Surgeons should strive more energetically for anatomical perfection which meant a nearer approach to functional perfection and the prevention of sequelæ due to inaccurate replacements. It was dangerous to advocate incomplete reduction in an adult; to live habitually in an atmosphere of surgical compromise was stunting to progress and likely to develop surgical cynicism. The desirability of anatomical reposition and the use of X rays called more and more often for direct operative approach. Bone was no longer regarded as a dry, inert, stable, terminal form of matter serving as the passive framework of the body. It was flexible, living, unstable, changing tissue—an active organ, intimately associated with the vital processes of the body and sensitive to all extraneous influences and events. It was a delicate tissue demanding great consideration and gentle handling. This view of bone emphasised the importance of immediate and exact reposition of fracture fragments, so that the reparative process would be least interfered with and ideal union accelerated. A fracture was an injury to a

complicated intelligent mechanism, and the recovery of the normal functioning of the whole organism was at stake. The will was involved in every fracture and influenced the recovery of function: the earlier the will coöperated in securing return of function the more rapid and complete was the recovery of the individual. There could be no rigid rule as to the time of union of a fracture, and the parts could be moved as soon as movement would not disarrange the replaced fragments. Absolute fixation by operation secured the minimum of callus necessary for sound repair, and allowed early movement without disturbance. Operative treatment of fractures was logical, natural, and had come to stay.

Indications for Operation.

Granted skilful surgery and anæsthesia and the necessary apparatus, the important indication for open operation was that it secured an earlier return to a more nearly normal function than any other form of treatment. This did not mean that every fracture should be operated upon. Operative advance should be safeguarded, and limited to skilled surgeons in hospital surroundings. Each case was a problem by itself, dependent on the exercise of the highest type of surgical judgment. The surgeon must have an adequate knowledge of the patient, physically, mentally, industrially, and socially, and of all the conditions. He must have perfect instrumental, mechanical, and physical equipment, an accustomed and proved technique, an understanding of the nature of bone tissue and its reactions, experience of both operative and non-operative procedures, and an open mind in selecting the one best adapted to the case in hand. No other surgeon should employ the operative method. The time to worry about the outcome of fracture treatment was in the first two hours after injury. Adequate immediate treatment would do much to prevent difficulties. Among fractures never operated upon were Colles's fractures, fracture of the clavicle, and many occurring in childbirth, childhood, and adolescence Fractures usually operated upon were fractures of the great tuberosity of the humerus with displacement, of the surgical neck of the humerus with dislocation, of the olecranon with separation of the small fragment, of the head or neck of the radius with sufficient displacement to limit movements, and of the shaft of the radius with displacement of the ulna. Most surgeons also operated upon separated or displaced epicondyles of the humerus or femur, certain elbow-joint fractures, and oblique or spiral fractures of the tibia and fibula, displaced fragments of the patella, irreducible fracture of the femoral shaft, fractures of the os calcis in which the line of fracture entered the astragalo-calcaneal joint, certain metacarpal and metatarsal injuries, and fractures about the ankle-joint which were difficult to hold. Operation was very doubtfully applicable for fractures of the spine with immediate symptoms of transverse lesion of the cord, fractures of both bones of the forearm, and of the humerus above the middle. Proper traction on the femoral condyles, tibial crest, or malleoli, or through the os calcis, might diminish the necessity for operation.

Almost any fracture of the neck of the femur entered the capsule, and the treatment of election was traction under general anæsthesia, with internal rotation, abduction, and hyperextension. Sixty per cent. of cases at the Massachusetts General Hospital had secured bony union by this method. There was no way of identifying the other 40 per cent. in advance, but careful study of the skiagram would show that the neck was being absorbed and that union would not take place. The second choice was the reconstruction operation rather than pegging. Cotton, of Boston, believed in artificial impaction instead of abduction. He put his stockinged foot into the injured groin and pulled until both legs were of equal length. Then, inverting the leg with the pelvis supported, he put a double piece of Sadler's felt over the great trochanter and hit it with a wooden mallet. His results were satisfactory. Delbet, of Paris, pegged practically all his adult cases and got union in 50 per cent. In another Paris clinic a bone-graft was placed on the neck of the femur with surprising accuracy by a special piece of apparatus.

Advantages of Opportunism.

Sir ROBERT JONES (Liverpool) said he was pleased to note that though Dr. Scudder was, at the beginning, a strong advocate of the purely operative method, he yet encouraged perseverance with non-operative measures. For himself, he did not like to feel that he belonged to any one "school," because he was sure the truth did not remain in any one of them, and probably not in all put together. So very much depended on the surgeon who saw the case—on what he could do and what he could do well. At one time plating and wiring had been carried to extremes; he had once removed a plate from a child 6 months old, and they had often had to be removed because they were beginning to give trouble after two or three years. This had led to a reaction to the other extreme. Dr. Scudder said that in cases of fracture of the femur it was necessary to operate in order to secure perfect anatomical reposition. But everything depended upon which was the good and which was the bad type of union. In the femur end-to-end apposition was good, but if there was very slight deflection it was bad. A slightly overlapping fracture, if in good alignment, was a better result than an end-to-end apposition which had been allowed to cant to one side. He had seen cases in which plating had been done and this point had obviously not been remembered. In the treatment of fractures of the femur the good results were attained by gradual extension rather than by immediate reduction. That was the great difference between the direct operative attack and the attack made by other means. He agreed that spiral fracture of the tibia often required operation, especially when there was also shortening. Sometimes a spiral fracture, with one end riding over the other, looked very bad by X rays, but was not really unsatisfactory, since by rotating the ankle good apposition could be obtained. Sometimes fracture of the forearm was very difficult to deal with, especially when the radius came in contact with the ulna, but out of thousands of cases he did not remember more than a dozen in which he had had to operate. Reduction had to be very carefully carried out. Operation was required for fractures of the scaphoid. Here the main trouble was dorsiflexion, and sometimes there was limitation of flexion of the wrist. His first act in these cases was to increase the deformity, putting all the pressure he could on the scaphoid and semilunar to force it back. If, clinically, he got an easy movement of dorsiflexion, he considered the case would do well. Otherwise he did not hesitate to cut down at once and remove the obstructing bone. That was much better than delaying operation for weeks or months, for then success was only partial. For fractured patella in a young man who wanted a freely movable joint he would always operate by stitching rather than by putting in plates or pegs or wire. He would not do this in the old and feeble. It was common to see Pott's fracture plated, although, if seen early, it was one of the easiest forms of fracture to manipulate. Whatever method of treatment was adopted, accidents such as ischæmic paralysis might occur, and many cases arose in the law courts because the operator, not having had this possibility in mind, had omitted to warn the patient.

Anatomical Reposition.

Prof. HEY GROVES (Bristol) said it was an accepted principle that operative treatment was indicated when conservative or non-operative methods had failed. It must be considered, however, what constituted satisfactory anatomical reposition by non-operative methods, and what were the cases which should be operated on without wasting time on other methods. He thought the advocates of operative treatment had gone a little too far in stressing the need for complete anatomical reposition. His view was that if the length of the bone and the alignment

were correct, slight lateral displacement was of comparatively small importance so long as contact between ends of the bone was secured. Other things being equal, he was convinced that cases treated by non-operative methods showed a more rapid and a firmer union, with a quicker return to function, than did those submitted to operation. After the ordinary plating operations there was a very slow growth of callus, and union of the bone was tardy. Open fracture was to many surgeons a strong lure towards operation, but often this treatment was followed by great delay, if not indeed by disaster.

To decide which were the cases in which conservative methods were only waste of time was largely a matter of experience and observation, but he would say that fractures in the neighbourhood of joints in which the fragments could not be placed in accurate apposition by manipulation came into this class, as did also fractures of the forearm, and particularly of the radius with ulnar deviation of the distal fragment of the radius. He would also place in this category fractures of the olecranon and patella with wide separation, and fractures of the true neck of the femur in young and vigorous persons. Experience showed that it was usually impossible to bring about accurate reposition of bone without suturing the bone at all. The simplest method was the non-operative manipulation of the bones together, impacting them under the guidance of the fluorescent screen. There were cases in which this could not be done because soft tissue was interposed between the bones; and in those, following skeletal traction, open operation should be done, the bones being fitted together after obstructing tissues had been removed.

Treatment of Some Common Fractures.

Mr. H. A. T. FAIRBANK said that the difficulties of the student and the practitioner arose not so much from ignorance of broad principles as in their application. He should be cautious in deciding without assistance. The surgeon should always keep in mind the enormous difference between operating in the first week and after the lapse of (say) six weeks. This was especially important with fractures involving joint surfaces. In these absolute perfection in the anatomical result of operation was essential, and might be unobtainable unless the fracture was quite recent. Fractures of the shaft, on the other hand, could be operated upon satisfactorily almost at any time. The day of election for operation was, he suggested, the fourth.

Referring to some of the commoner fractures, Mr. Fairbank said that almost the only indication for operation in fracture of the shaft of the *humerus* was damage to the musculo-spiral nerve. With an internal or external condylar fracture, if there was displacement to more than a minute degree, operation should be performed. In external condylar fracture, which was by no means rare in children, the fragment might be rotated by more than 90°, a condition often unappreciated. In supracondylar fracture, if the usual displacement was complete and could not be reduced by manipulation, he thought open operation advisable, provided it could be done within a week of the injury. When six weeks or more had elapsed gross displacement was far better left alone. A nerve lesion should be regarded as one factor in favour of open operation; but when displacement was slight or had been already reduced, a nerve lesion, per se, was not an indication for immediate operation. With fractures of the head and neck of the *radius*, "when in doubt operate." If the head was completely loose it should be removed, but if the periosteum was largely intact the deformity should be corrected and the head should not be removed. Most cases of fracture of the shafts of the *radius* and *ulna* should be operated on if there was overlapping. Colles's fractures only required open operation when they were united in bad position and could not be refractured. Separated epiphysis demanded the same treatment, but this was not so imperative for a relatively small degree of tilting. The displacement that really mattered in a Colles or separated epiphysis was backward tilting; it might be disastrous to function. Moderate backward displacement without any tilting was of no functional importance.

In fractures of the neck and shaft of the *femur*, operation was rarely required if treatment was properly carried out. Plating of the shaft of the femur was advisable, without an attempt at conservative measures, when the soft parts below the knee were damaged or when there was a second fracture in the limb. In the lower third—admittedly more difficult to treat—operation was more often advisable, especially with separation of the lower epiphysis with displacement. In fracture of the femoral condyles operation was imperative if the displacement was more than very slight. The tibial tuberosities were extremely difficult to deal with by open operation, and if fair accuracy could be got by manipulation the fracture was best left alone without operation. Fractures of the shafts of the *tibia* and *fibula*, on the other hand, were very favourable for operation. Want of apposition of fragments was in itself sufficient reason for operation, while overlapping of more than ¼ in. in oblique fractures made it imperative in the absence of contra-indications. "In transverse fractures of both bones with complete disengagement of fragments, operate every time," said Mr. Fairbank, "however slight the overlap may be to begin with." Oblique fractures, if requiring operation at all, should be plated; the transverse usually required no internal fixation.

More than any other joint, the ankle needed absolute accuracy. The lower the oblique fracture in the fibula, the more likely the need for operation. In the young active adult comparatively slight displacement would give a considerable percentage of imperfect results unless operated upon. In those of the third degree operation was much more often advisable, and should be resorted to without hesitation, even in patients somewhat past middle life. In cases of all sorts the slightest outward tilt of the astragalus demanded operation if it could not otherwise be corrected. Backward displacement of the foot must, of course, have been entirely overcome.

Organisation of Treatment and Research.

Mr. W. A. COCHRANE (Edinburgh) said that, in the main, he was in agreement with Dr. Scudder's conclusions, but he thought such discussions as this would be futile until a definitely improved organisation was available. In this direction the Committee of the American Medical Association had done much, for they had encouraged the setting up of centres for the treatment of fractures in hospitals, had improved the teaching of students, and had ascertained the end-results with different methods. The problem now being discussed was one which varied with the particular person who had to look after the case. There were certain fractures which should be operated upon, particularly those in or around joints. Another kind which should be operated upon was that typified by fracture of the lateral condyle of the humerus. Many of these cases were not well controlled by X rays. There was apparently good reposition, but by non-operative means one could not bring about good reduction. In many of the more comminuted fractures which passed into joints he thought it would be well to combine the operation with immediate arthrodesis. For fractures of the diaphyses he agreed that non-operative means should be employed almost wholly. But when time had elapsed a selection must be made. In some cases of spiral fracture of the tibia operation was required. Non-operative methods had proved of great value in diaphyseal fracture, but operations had a definite place in articular and juxta-articular fractures. As a rule, there was no need to fear infection.

Mr. P. B. ROTH thought that operation should always be performed if there were displaced fragments which could not be reduced in any other way. And when operation was needed it should be done as soon as possible after the accident; even in fractured patella he would operate on the following day. The

presence of blebs, if they had not broken, was no bar to operation. Always operation should be done for fracture of the spine of the fibula; also in fractured lower end of the fibula when there was dislocation of the foot backwards. If a fracture could not be reduced under the first administration of an anæsthetic he thought it a waste of time to try again in the same way. He had had many fractures sent to him which had been left untouched because they were compound. He submitted that it should be regarded as an aphorism that displaced fragments must be replaced, even if to do so required an open operation.

Mr. McCRAE AITKEN desired to emphasise the point, made by Dr. Scudder, that it was very important to treat bone as a living structure and not as a mere skeletal and terminal framework. This would greatly help a right conception of what happened when treatment was aided by the use of foreign bodies.

Dr. J. B. MENNELL pointed out that the presence of synovial fluid between fragments inhibited the formation of callus; in joint fractures—particularly at the head of the radius and the lower end of the humerus—a good result could be got by means of movements from outside without fear of anything unpleasant happening.

Dr. SCUDDER, in reply, reminded his audience that fractures had been treated for thousands of years in much the same way as they were being treated to-day, and without, in many instances, reference to fundamental principles. He wished to leave the impression that as a result of a very long experience in this matter, and the experience of the last few years in particular, the profession now stood on very solid and dependable ground, so that it could be said that fracture cases were now being taken care of better than years ago, because practice was based upon agreed fundamentals. The keynote of the situation was struck by Mr. Cochrane; individuals must get together and coöperate, sit at a round-table conference, and compare experiences. This process had been greatly neglected in the past, but a good start had now been made, and he hoped such centres of surgery as London, Bristol, and Edinburgh would get to work on it. The experimental work of Mr. Hey Groves had done much to advance knowledge of fractures. For adequate discussion it would be necessary to pool issues and experiences. It was most important to know accurately what were the actual functional results. He contended that at present the trustees of hospitals were not carrying out their trusts properly in the matter of running the machinery which was to take care of the poor.

SECTIONS OF WAR AND OTOLOGY.

DISABILITY FROM MIDDLE-EAR DISEASE.

ON April 13th these Sections met jointly, with Group-Captain H. V. WELLS in the chair, to discuss the Effects of Middle-ear Disease on Efficiency in Civil and Military Life.

Wing-Commander DAVID RANKEN said that the possible complications of middle-ear disease included recurrent earache, difficulty of hearing, otorrhœa, tinnitus, vertigo, and intracranial complications. Recruits having poor auditory acuity were naturally unsatisfactory, and a cold sufficed to impair it further. Often accused of inattention, these subjects complained that they were passed over when promotions were made, whilst a man liable to vertiginous attacks would not be chosen for positions of danger. The bad effect of this disability on general health accounted for frequent charges of malingering. Flying officers liable to unilateral or bilateral Eustachian obstruction might develop, especially when descending from a height, such severe middle-ear and labyrinthine symptoms that they lost control of their machine. In the Services one view was that men with intractable middle-ear disease should be invalided out; another was that, in view of the expenditure already incurred in training them, efforts should be made to bring about a cure.

With regard to the important question whether the aural standard of recruits was to-day too exacting, Wing-Commander Ranken submitted a table showing that, in 1922, 4·6 per cent. of the rejections of recruits for the Royal Air Force were due to aural disease, the corresponding percentages being 9·2 in 1923, 7·7 in 1924, 9·3 in 1925, and 5·4 in 1926. The average for all the years was 7·4 per cent. As a result of his experience in the R.A.F. since its inception, he did not think the present standard too exacting; indeed, in some respects the conditions were not sufficiently strict. Most of the middle-ear trouble had begun before the recruit entered the Service. Eight years ago he had recorded the result of the examination, by aural experts, of nearly 50,000 aviation candidates, only 2·8 per cent. of whom were excluded on account of aural disease.[1] In a peace-time army he thought there was only one way of obtaining aural efficiency—namely, by excluding all who had had chronic aural disease or who had an upper respiratory tract of the type which yielded a large percentage of aural trouble. This had been done in the R.A.F., and now the amount of aural disease in the flying personnel was negligible. Only those medical officers should be employed on recruiting who had had training in the examination of nose, throat and ear.

The question remained whether conditions should be relaxed in the event of another great war. If so, what alteration should be made? The debatable cases would be those with chronic suppurative otitis media, with or without defect of hearing, who were otherwise healthy. Here the decision should rest largely on the presence or absence of symptoms over an immediately preceding lengthy period. The work being done in school clinics, and the increase of aural specialists in hospitals must lessen the sum total of cases of aural disease, and so produce a higher physical standard among the general populace.

Mr. SYDNEY SCOTT quoted figures issued by the Metropolitan Life Insurance Company of New York, to show the serious economic loss due to aural disease in America. Some limited defect of hearing was very common in the community. If hearing was normal, the residual whisper should be heard at a distance of at least 20 ft., with each ear separately. Mr. H. J. Banks-Davis, who had had much experience in testing candidates for the Civil Service, had given him the following brief indications of the basis on which he worked. As a rule, deafness in only one ear need not disqualify, nor should the accidental rupture of one tympanic membrane. When middle-ear disease had been radically cured by a mastoid operation, an ordinary certificate could be considered six months afterwards. Cases having a history of suppurative otitis media could be given a special recommendation for two years if the condition was inactive at the time. Ineligible persons, Mr. Banks-Davis considered, were those with marked deafness in both ears, suppurative otitis media (if active at the time of the examination), or deafness which was probably progressive. Candidates for the post of Officer of Customs and Excise and in the telephone and telegraph services must have normal hearing. It was important that every defect discovered in the ears of an applicant for service in Army or Navy should be carefully recorded, especially in an otherwise eligible man. A large number of men in the war had aural disorder at enlistment, and many had discharging ears for years, yet a large proportion of these were good and efficient soldiers. It was difficult to separate them from those who had sustained actual damage to the ears in the war. People with a certain degree of otosclerosis heard very well in a noise, and some heard particularly well when the flying-machine was in the air. Men having perforation on both sides did successful flying in the war, and they did not suffer from giddiness, however quickly they might dive. Such cases would be excluded when recruiting in peace-time, but this rule might well be relaxed in war-time.

[1] THE LANCET, 1920, i., 800.

Major W. T. HARE showed by a series of tables and graphs that in a time when it was more difficult than ever to attract recruits an increasing number were being rejected at the medical examination, the increase being partly due to aural disease. Therefore the Army medical authorities had seriously to consider whether the present somewhat stringent regulations concerning recruitment of men with aural trouble, but without accompanying deafness, could not be modified. He adduced a number of reasons for a lowering of the present aural standard. Recently the standard had been that no recruit should be accepted who had any of the following defects: deafness, aural discharge, perforation, radical mastoid operation, dermatitis of the meatus, conditions preventing a good examination of the drum after removing the cerumen, and conditions which had been associated with recurrent headache, deafness, tinnitus, or vertigo which could not be accounted for by the state of the upper air passages. A further reason for asking an easing of the standard was that the examination presumed an expert otological knowledge which many examiners did not possess. Of recruits discovered to be suffering from aural disease or its effects, in less than 10 per cent. was aural deficiency suspected, because most of the men were able to hear orders on parade. In nine out of every ten men having aural defect the condition was present on enlistment, but it might arise in the Service as a result of bathing parades, boxing, exposure to gun-fire, and other causes. Only one ear, nose and throat specialist was employed in each Command, and he had more work than he could conveniently cope with. If more men with aural lesions were likely to be accepted in the Services, it was very important that medical officers should have received special aural training, so that they could take their share of the additional work.

Mr. T. B. LAYTON emphasised the vast difference, in such a question as this, between the circumstances of peace-time and those of a great war. He considered that deafness, giddiness, and an aural discharge ought to be adequate reasons for excluding a recruit. In connexion with giddiness, the important point was the danger of malingering, which could be divided into subconscious malingering and deliberate attempts at deception. If a man had complained of giddiness, it was impossible to insist upon his going back to duty. There was a dread lest persons with discharging ears should develop meningitis, but this was a thing which rarely happened. Active chronic suppurative otitis media was very different from the residual form, which was simply evidence that at some time there had been active disease. He did not see why the latter cases should not be accepted; they were no more liable to acute infections and acute mastoid disease than ordinary people. The radical operation or the modified radical should not be done, he thought, on men while in the Service, as there was always liability to a further breakdown. He concluded by laying stress on the great importance of every recruit being aurally examined, and agreed with Major Hare that more otologists were required in the Army.

Mr. T. RITCHIE RODGER spoke of the relationship between suppuration in the middle ear and deafness in the internal ear due to excessive noise. Some text-books stated that middle-ear disease predisposed to occupational deafness, and therefore examiners of recruits in certain branches of the Services were inclined to at once reject any man who had any middle-ear defect, as he was considered to be more vulnerable to the effects of gun-fire. He wished to insist, however, that so far from middle-ear disease conducing to gun-deafness, the opposite was true; most middle ear conditions were a protection against noise-deafness. Injurious sound waves reached the cochlea by way of the tympanum, not by bone conduction; therefore anything which reduced or damped the normal conducting power of the tympanic membrane and the ossicles would lessen the injury to the delicate nerve-endings of the cochlea. The prevention of noise-deafness was to be achieved by the regular blocking of the external auditory canal, as by vaselined wool, jeweller's wax, celluloid, or rubber. This measure should be obligatory.

Surgeon-Commander J. A. MAXWELL spoke of the prevalence of middle-ear disease in the Navy, which was high in comparison with the total invalidism, higher figures being reached only by diseases of stomach and intestines, catarrh, venereal disease, and injuries. In one year, however, there were only three deaths from aural disease in the Navy. Chronic otitis media, which occurred as a recrudescent disease in older men, should be regarded as a cause of invaliding sine die. Nerve deafness was, in his experience, uncommon; when internal nerve deafness was found, it was due to syphilis more often than to gun-fire. Traumatic rupture of the tympanum was rare. He did not consider that the present Army standard for hearing was too exacting. Abnormalities in the nose and throat should be searched for, as conditions on a modern warship imposed a great strain on the recruit; hence there should be a number of expert medical officers at sea. He felt sure that the increased attention to dental conditions would greatly lessen the septic diseases encountered in the ear.

Sir JAMES DUNDAS-GRANT said that a perforation situated centrally or near the anterior part of the membrane, with a mucous discharge rather than one thickly purulent, was comparatively harmless. It was quite otherwise when the perforation was in the postero-superior segment, close to the attic and aditus. The otologist at the front should realise that a man with cholesteatoma, in esse or in posse, was in a more dangerous position than one who had a perforation lower down. Referring to Mr. Rodger's remarks, he said that Moure, of Bordeaux, had shown that men with nasal, naso-pharyngeal, and throat trouble were more liable than others to suffer from concussion-deafness. Everything pointed to the need of routine otological examination, and it was to be hoped that the authorities would recognise it.

Colonel P. H. HENDERSON said that it had been very disappointing, in 1918, to find that out of every nine men of military age only three were really fit; and even with the present voluntary Army the standard of health was apparently not much better. If the numbers required for the Services were not forthcoming, the physical standard for admission must be lowered. It had been shown that from 30 per cent. to 40 per cent of the children attending school suffered from some physical defect. Yet the Expeditionary Force which went to France in the recent war was admittedly the finest which had ever left any country. In 1923, 323 men were invalided out of the Army on account of suppurative middle-ear disease, 128 for "ordinary middle-ear disease." There was not much evidence supporting the idea that aural trouble greatly reduced men's capacity as fighting soldiers. The middle-ear disease which followed influenza was more amenable to treatment than other forms.

Mr. A. R. TWEEDIE said that of the men who formed the successful force at Gaza 15 per cent. had chronic suppurative otitis media. In peace-time he thought that, if possible, every man who had an intranasal, a postnasal, or an aural lesion should be excluded. And he was pleased to hear Mr. Sydney Scott stress the importance of rhinitis.

Mr. LESLIE POWELL, discussing the question of aural disease before the recruit was accepted for service, said it was hard if a man, having been accepted as fit and continued in the Service, was denied his full pension after the war because it was sought to prove that he had had disease from the ear before becoming a recruit.

Dr. J. H. MACDONALD said that the recruiting figures for the Royal Air Force had not varied greatly in the last few years as regards rejections for aural disease. He agreed with Wing-Commander Ranken that there seemed no reason to alter the standard of examination for ears; the number of recruits required could be obtained, and in an emergency the subject could be reconsidered. In that branch of the Services the system of examination was a

centralising one, and it was easy and convenient to get specialist advice when it was needed. He looked forward to a time when preventive medicine will have made unnecessary so much examination of candidates wishing to enter the Services.

The CHAIRMAN, summing up briefly, said the view which had been expressed that most of the aural disease in the Services was present before enlistment coincided with the view held by the Service medical officers. It needed careful consideration.

ABERDEEN MEDICO-CHIRURGICAL SOCIETY.

AT a meeting of this Society on April 5th, Dr. THOMAS FRASER, the President, in the chair, a paper on

Basal Metabolism in Clinical Medicine

was read by Dr. ALEXANDER LYALL. After referring to the earlier work of the physiologists, he proceeded to describe the method commonly used for calculating the basal metabolic rate (B.M.R.) in clinical practice. The data necessary were the height and weight of the patient, the total volume of expired air over a known experimental period, and the respiratory quotient and oxygen-consumption during the time of estimation. Under suitable conditions uniformity of results was achieved by this method. In one mild case of exophthalmic goitre where the estimation had been carried out four times at intervals of a month the oxygen-consumption had been 254, 251, 255, and 258 c.cm. per minute, with the respiratory quotient about 0·82 on each occasion. The experimental error in the method was about plus or minus 8 per cent., but Dr. Lyall believed that the error tended always to be towards the upper side. Thus a B.M.R. of plus 10 per cent. was within normal limits, whereas a B.M.R. of minus 5 per cent. showed a degree of reduction from which diagnostic inferences could be drawn. Dr. Lyall had investigated by this method, once or repeatedly, a series of 45 cases of exophthalmic goitre. The B.M.R. was increased by 15–30 per cent. in 14 cases, by 30–60 per cent. in 22, and by more than 60 per cent. in 9. The highest rates were plus 87 per cent., plus 97 per cent., plus 100 per cent., and plus 105 per cent. Three of these four severe cases had auricular fibrillation, the patient with the highest rate being a typical case of the fulminant type of the disease. Generally speaking, the group of cases, classed as mild by estimation of basal metabolism, were those likely to become good civil lives within a reasonably short period of medical treatment alone. The cases in the group of moderate severity were likely to stand operation well if there was no other contra-indication. The group with B.M.R. above plus 60 per cent. made poor surgical risks. Additional factors which should be taken into account in considering the operative risk were as follows: (1) there should be no organic heart disease; (2) the blood-urea should be below 50 mg. per 100 c.cm.; (3) the patient should have already regained half the previous loss in weight; (4) the blood pressure should not be higher than 140 mm. Hg systolic and 70 mm. diastolic; (5) the patient should have already regained a fair measure of self-control. In nine of the cases in which glucose-tolerance tests had been carried out, the blood-sugar curves showed inability to deal properly with glucose. The condition should not be confused with true diabetes, although three cases of diabetes mellitus occurred in this series. Eleven cases of myxœdema had also been investigated, the B.M.R. varying from minus 3 per cent. to minus 42 per cent., the average reduction being 14 per cent. In four of these cases exophthalmic goitre had previously been present. A series of cases of toxic adenoma of the thyroid and simple adenoma had shown that the B.M.R. was raised in the former group of cases but not in the latter. In the goitre of puberty the B.M.R. was not increased. The estimation had not been found of value in the diagnosis of malignancy of the thyroid gland.

Reviews and Notices of Books.

RECENT ADVANCES IN MEDICINE.

Fourth edition. By G. E. BEAUMONT, M.A., D.M. Oxf., F.R.C.P., D.P.H.; and E. C. DODDS, M.D., Ph.D., B.Sc., M.R.C.P. Lond. London: J. and A. Churchill. 1928. With 48 illustrations. Pp. 426. 12*s.* 6*d.*

SINCE the appearance of the third edition in 1926 several important additions have been made to this invaluable work. One of the chief of these is a section on the diagnosis of spinal cord compression. Although, normally, the fluid of the cisterna and that of the lumbar spine has the same composition and exhibits similar pressure variations, changes in these factors may occur above and below a block. The cisterna is tapped by Ayer's method, and a lumbar puncture is performed simultaneously; if a spinal block is present, withdrawal of fluid by lumbar puncture will not affect the cisternal pressure, nor will gentle compression of the jugular veins raise the lumbar pressure. The stagnation of fluid below an obstruction causes certain chemical changes, known as the "loculation syndrome"; the protein increases from 0·02 per cent. to 3 or 4 per cent., the fluid has a yellowish tinge due to blood pigment from the congested meningeal vessels, and spontaneous clotting occurs owing to the increase of fibrinogen. In addition to this method lipiodol may be injected into the cisterna and the spine photographed under X rays. A splendid picture illustrating a typical block is given.

A section on the parathyroids sketches the history of research into these glands, and describes the work of Collip, in 1925, in his successful search for a potent extract. The chief use of this is to control the tetany which follows thyroparathyroidectomy; the dosage is still uncertain, but it appears that five units per kilogram of body-weight will raise the blood calcium to normal limits in 24 hours, and much less will maintain it at the normal level. The extract is also effective in other conditions involving a decrease in the blood calcium, such as infantile tetany, but in tuberculosis, although it will relieve some of the symptoms, it is of no fundamental value. The excretion of calcium from the bones which follows its administration is accompanied by an excretion of lead in patients suffering from plumbism, and Hunter and Aub have found the extract valuable in the treatment of this condition. They regulated the dosage by the blood calcium, maintaining its level slightly above normal for varying periods. This drug is a very potent one, and only suitable in selected cases and under adequate laboratory control.

The chapter on the heart has been enriched by a description of the action of quinidine, the understanding of which depends upon a grasp of the "circus" movement that manifests itself in auricular flutter and fibrillation, instead of the radial path pursued by the wave of excitation in the normal heart-beat outward from the sino-auricular node. The circus movement depends upon the presence of a gap of excitable muscle between the head and tail of the wave, and to close this gap stops the movement. Quinidine will lengthen the refractory period of the muscle and so tend to stop the wave, but it may also slow the rate of conduction of the impulse and so perpetuate the movement; which effect it will have depends upon the individual patient. It restores normal rhythm in 50 per cent. of cases, but obviously has very definite dangers. A paragraph on the administration of digitalis by cat unit tablets has been included, and the electrocardiogram of acute thyrotoxicosis is compared with that of physiological tachycardia. In addition to these changes nearly every chapter has been revised and brought up to date. The book was first written as a link between clinical and laboratory workers, as an instructor to the aspirant towards higher medical examinations, and as a stand-by to the busy general practitioner. Its virtue is that it records the practical experience

not merely the theoretical learning, of its authors, and its influence in the propagation of modern knowledge has been, and doubtless will continue to be, very large.

SURGERY OF MUSCLES AND TENDONS.

Die Chirurgie. Eine zusammenfassende Darstellung der allgemeinen und der speziellen Chirurgie. Edited by Prof. M. KIRSCHNER, Tübingen, and Prof. O. NORDMANN, Berlin. The 21st Instalment being Vol. II., Part 2, pp. 867–1104, containing the Surgery of Muscles, Tendons, and Fasciæ, by Prof. W. MÜLLER, Marburg (Lahn). With 108 illustrations in the text and 16 coloured plates. Berlin and Vienna: Urban and Schwarzenberg. 1928. M.17. (Not sold separately.)

THIS instalment of a comprehensive work on surgery begins with the surgery of muscles and includes articles on their normal anatomy and physiology, on their repair when injured, and on free transplantation of parts of muscles, to repair defect or to check hæmorrhage. Degenerative and inflammatory changes in muscles and parasitic affections such as trichinosis or echinococcal disease and tumours, may call for surgical interference, but when the author comes to contracture of muscles and traumatic affections we are on more familiar ground. Ischæmic contracture is fully discussed, though the practical treatment of late results is treated inadequately and without illustrations. Wry-neck and its treatment, including Rowlands's method of lengthening the sterno-mastoid, has a section to itself. The greater part of the instalment, however, is devoted to the surgery of tendons, which is described very fully with the aid of illustrations in the text and in coloured plates. Treatment of the results of direct injury to tendons and that of paralysis by means of tendon transplantation are also well set forth. The surgery of fascia as here described mainly consists of the use of that tissue as a means of repairing injuries and defects of other structures and to form sheaths and ligaments. Its use in place of cartilage and synovial membrane in the making of new joints as in arthroplasty is omitted, as that procedure belongs to the section dealing with the surgery of joints.

This fasciculus contains much valuable information, and the diagrammatic illustrations are clear and should be useful guides to those undertaking operations on muscles and tendons. Like most continental works, it pays little attention to British or American research or practice, although so much work has been done in orthopædic surgery of late years by English-speaking surgeons.

STUDIES IN PSYCHOLOGY.

By WILLIAM ELDER, M.D., F.R.S.E., Consulting Physician to Leith Hospital. London: William Heinemann, Ltd. 1927. Pp. 207. 8*s.* 6*d.*

Dr. Elder attempts in this volume to reduce all psychological problems to a physiological basis. He opens with an account of the neurology of the human organism and passes on to consider memory and the affective conative life. Accepting Herrick's interpretation of will as the anticipation of the future environment based upon power of recall, the author finds himself able to hold a modified view of free will. As an orthodox neurologist and a follower of the old associationist psychologies he has very little use for the current doctrines of the unconscious. Consciousness is essential for reasoning, and the attributing of reasoning powers to unconscious promptings and balancing of these promptings as the Freudians do finds in him little response. There follows a useful chapter on sleep, its mechanism and significance. Sleep to the author is an instinct become habit. This is hard to follow in the sense that instincts are themselves hereditary habits called up by requisite environmental patterns. It is merely the conditioning of the sleep by circumstances that may create sleep habits. The rest of the volume is devoted to dreams and the theory of dream symbols. Here the author finds little use in Freud's conception, and is apparently content with the cheese-before-sleep theory of our grandmothers. At the same time he has many pertinent criticisms of the wilder psycho-analysis of our day and his comment is agreeably free of the venom which characterises so much of the so-called scientific attack on Freudism.

Psychology and the Soldier. By F. C. BARTLETT, M.A., Fellow of St. John's College, Cambridge; Reader in Experimental Psychology and Director of the Psychological Laboratory of the University of Cambridge. Cambridge University Press. 1927. Pp. 224. 7*s.* 6*d.*

Mr. Bartlett, who is one of our leading psychologists, tells us in his preface that during the Great War every important belligerent country called upon its psychologists for advice and assistance, and now lectures in psychology form a part of the course of military study at Cambridge. This book is a selection of lectures delivered in connexion with that course. Research has put on a sound footing tests of intelligence, apart from education, and of special abilities, and the author makes clear their underlying principles; he also brings together the results of recent work on training and fatigue. The section on leadership, discipline, and morale offers an excellent example of the practical utility of organised psychological observation, and the classification of sectional leaders in a complicated organisation like an army into three types, *institutional*, *dominant*, and *persuasive*, is not only interesting, but could be read with profit by whoever is concerned with the selection of personnel in any organisation. The section on mental disorders of warfare is weakened by considering these troubles entirely upon the level of consciousness. This may be done by way of simplification or because the author rejects any theory of unconscious processes, though writers on the subject to whom he refers have all found some such theory necessary in discussing their clinical material. The title of the book was determined by circumstances, but it possesses utility and interest outside the military sphere.

LIPPINCOTT'S POCKET FORMULARY.

By GEORGE E. REHBERGER, M.D. London: J. B. Lippincott Company. 15*s.*

THE earlier half of this book is an index of treatment arranged according to disease. The latter half is divided into three parts; the first of these is a summary of the drugs of the United States Pharmacopœia X., the second a summary of those of the National Formulary, fifth edition, and the third gives a number of new and non-official remedies. In all these parts notes are added on solubility, dosage, action, and use. To the English reader the list of proprietary drugs will probably be of most interest. The treatment advised seems generally sound and is certainly compact in form.

JOURNALS.

JOURNAL OF PATHOLOGY AND BACTERIOLOGY, Vol. XXXI., No. 2. Pp. 141. 1928.—Hydatid fluid as an anaphylactic antigen, by C. H. Kellaway (Melbourne). By means of the guinea-pig uterus reaction it is shown that many samples of hydatid fluid contain protein belonging to the host. But, in some cases at any rate, another antigen is present which seems to be a protein derived from the parasite.—Cutaneous spirochætosis due to *Treponema cuniculi* in British rabbits, by D. K. Adams, D. F. Cappell, and J. A. W. McCluskie (Glasgow). "Vent disease" occurs in hutch and wild rabbits all over the world; it is not syphilis but it looks something like it, and the causative spirochæte cannot be distinguished microscopically from *T. pallidum*. It is readily cured by blue ointment or novarsenobillon.—A case of nervous cretinism with histological examination of the organs, by E. C. Eaves and M. M. Croll (Sheffield). Detailed accounts of the anatomy and histology of cretins are not abundant. In this case at 14½ years the pyramidal tracts were still not fully myelinated;

for other details see the original.—Hypercholesterolæmic splenomegaly, by S. C. Dyke (Wolverhampton). A woman with splenomegaly, biliary cirrhosis of liver, chronic interstitial pancreatitis, generalised xanthoma, and a record blood chole-terol of 1250 mg. per 100 c.c.m. The spleen gave no microchemical tests for lipoids unless it was first heated, but it contained a great excess of cholesterol on chemical analysis.—The practical application of the direct oxidase reaction in bacteriology, by J. Gordon and J. W. McLeod (Leeds). A new and elegant method of distinguishing the gonococcus in mixed plate cultures.—Causes and sequences in nephritis, by J. Gray (Aberdeen). The author believes, and supports his view with various observations and experiments, that the main cause of common non-suppurative nephritis in man is streptococci. The toxin circulating in the blood is concentrated in the glomeruli by the loss of water which occurs there, and in this way it may rise to a poisonous level till it is diluted again by reabsorption of water in the convoluted tubules. Simple poisons experimentally always cause tubular lesions and not the glomerular damage which can be produced with bacterial toxins and is the primary lesion in man.—The purpura-producing substance in pneumococci and the heritable susceptibility of mice, by W. Mair (London). Pneumococci contain a substance which causes purpura in white mice, especially in a selected inbred strain.—Experiments on the relationship of complement fixation to precipitation, by N. E. Goldsworthy (Cambridge). Complement is fixed in the early stages of precipitation of an antigen by its antiserum depending on the size of the particles.—A precipitinogen obtained from cultures of *B. aertrycke* Mutton, by F. C. Happold (Leeds). A preparation of proteid from broth cultures stimulates the production of precipitins and agglutinins when injected into rabbits.—Experimental monocytosis, by L. J. Witts (Cambridge). Infection with *B. monocytogenes* causes an intense large hyalin- leucocytosis; dead organisms have relatively little effect. Extracts of lymphatic glands also excite monocytes.—The two products of thyroid activity, by G. S. Williamson, I. H. Pearse, and H. M. Cunnington (London).—The experimental production of metaplasia and hyperplasia in the serosal endothelium, and of hyperplasia in the alveolar epithelium of the lung of the rabbit, by J. S. Young (Leeds). Extensive metaplasia (including stratified squamous epithelium) of the endothelium of the pleural cavity can be produced by the injection of a mixture of Sudan III. bile-salts and olive oil; the surface alveoli of the lung also show hyperplastic changes.—Blood changes occurring during the course of treatment of malignant disease by lead with special reference to punctate basophilia and the platelets, by R. W. Brookfield (Liverpool). Colloidal lead causes anæmia which is generally quickly regenerated; the characteristic punctate basophilia is due to a degenerative change in young red cells.—The ætiology of hepato-lenticular degeneration; experimental liver cirrhosis; poisoning with manganese chloroform phenylhydrazine bile and guanidin, by E. W. and P. E. Hurst (London). No evidence was obtained experimentally of any connexion between liver cirrhosis and degeneration of the lenticular nuclei of the brain as occurs in Wilson's disease.—Further investigations on selective bactericidal action, by E. A. Cooper and J. Mason (Birmingham). Continuation of the authors' work on "chemical" and "physical" disinfectants.—Pellagra-like lesions associated with deficiency of vitamin B_2 in the rat, by G. M. Findlay (London). Diets which lack the heat-stable component of the complex known as vitamin B lead to the development of a condition as much like human pellagra as can be expected in rats.—Tumours of mediastinum and lung, by T. Shennan (Aberdeen). Most are carcinomas of lung.—The immunity index method of testing antigenic values, by A. T. Glenny and H. Waddington (Beckenham). Periodic Schick tests on guinea-pigs may be used in a variety of ways to measure the efficacy of antigen.—Further notes on spontaneous agglutination of bacteria, by P. B. White (London). The agglutination of bacteria by electrolytes in the absence of specific serum and by non-specific serum may be due to a variety of causes.—The precipitation test in hydatid infestation, by N. E. Goldsworthy (Cambridge). In testing human sera for diagnosis respect must be paid to Dean's principle of optimal proportions.—The cultivation of the gonococcus, by A. Marshall (Khartoum). Agar with red corpuscles.—Book reviews.

New Inventions.

A NEW METHOD OF CUTTING LARGE SKIN GRAFTS.

THIS method of cutting large skin grafts of the Thiersch type, which I designed for plastic surgery at the suggestion of Mr. H. D. Gillies, depends on introducing a flat metal plate (Fig. 1) under the skin,

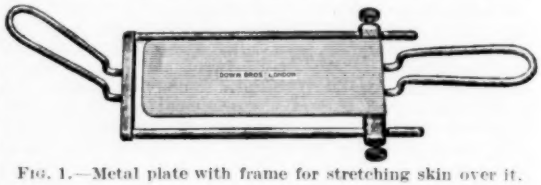

FIG. 1.—Metal plate with frame for stretching skin over it.

and from the flat skin surface produced over the plate shaving off the epithelial layer by a specially constructed knife. The skin and fat is undermined by a large blunt dissector (Fig. 2), the metal plate

FIG. 2.—Blunt dissector.

being introduced to steady and flatten the skin while it is being stripped of its outer layer. The details of the knife (Figs. 3 and 4), with its attachments to regulate the thickness of the graft cut, are too technical to describe in a short note, but it is sufficient

FIG. 3.—Razor with roller guard.

to say that the knife cannot in any circumstance cut through the skin. The graft is of uniform thickness and its edges are free from serrations. The limits of the mechanism as at present made enable one to

FIG. 4.—Razor with roller removed.

cut grafts from 2 to 4 inches wide by 6 inches in length, depending on the size of plate used; within these limits any predetermined size of graft can be cut with certainty. The only additional wound the patient suffers is a linear incision, through which the plate is introduced under the skin and which is closed on withdrawing the plate.

Briefly the outfit consists of a set of plates of three different widths according to the width of graft desired. Each plate is fitted with an adjustable "fork" which fixes the skin over it, both plate and fork have handles which enable the assistant surgeon to steady it. For each plate, a knife whose cutting edge is 7 inches in length, is fitted with a series of rollers and regulating mechanism, whereby by a sawing movement the epithelium is removed.

The device is being made by Messrs. Down Bros., London.

R. LANE JOYNT, M.D., B.Ch. Dub., F.R.C.S. Irel.

THE LANCET.

LONDON: SATURDAY, APRIL 21, 1928.

VOLUNTARY INSURANCE AGAINST SICKNESS.

THE mature student of international social conditions, who looks back to the difficulties that beset his youthful efforts to obtain data on which he could depend, may well congratulate his younger colleagues on the wealth of material so laboriously collected and so admirably presented by the indefatigable workers of Geneva. Information that formerly could be extracted only from a variety of documents, not easy to obtain and certainly not easy to read except by accomplished linguists, is now served up specially prepared for ready assimilation in the publications of the League of Nations and the International Labour Office. In the issue of THE LANCET for March 3rd we had occasion to comment on the monumental study of compulsory sickness insurance issued by the International Labour Office, and the companion volume on voluntary insurance has now been published.[1] Mutual aid among the working classes taking the form of voluntary insurance against disablement through disease or injury is not a new social phenomenon; it can be traced back to the Middle Ages. The craft guilds, to which both masters and workers belonged, made some provision for helping their members in times of disablement, and in the journeymen's guilds, which in the fourteenth century the journeymen, dissatisfied with the craft guilds, began to organise on their own account, this kind of mutual aid was more highly developed. The assistance given took the form of a loan to be repaid when working capacity had been restored. An illustration is found in the following rule of the Fraternity of Bachelor Journeymen of Lucerne in 1560:—

> "Every brother who becomes disabled, or falls sick, shall receive the sum of 3½ pfennigs a day if he needs it, but if the Lord restores him to health and enables him to take up his work again, he shall repay the money. If his incapacity is prolonged, and if his needs are greater, money shall be lent to him on security and if he dies the Fraternity shall recoup itself from his estate."

The work begun by the guilds was carried on after their decay and disappearance by other organisations, friendly societies, trade-unions, and employers' welfare schemes; and in the last 50 years it has been much extended and developed; from the Old World it has spread to America, Australia, and South Africa. The proportion of persons voluntarily insured against sickness varies considerably in the different countries, ranging from 1 per cent. in Canada and 1·87 per cent. in Spain to 13·5 per cent. in Great Britain and 14·3 per cent. in Belgium. In Denmark, where there is no compulsory insurance, the proportion of the population voluntarily insured is no less than 57 per cent., but Denmark occupies an exceptional position. The Danes have a genius for voluntary coöperation, and in the field of sickness insurance as in agriculture they have achieved remarkable results without invoking the weapon of compulsion. But the success of the Danish system must to a considerable extent be attributed to the large subsidies from public funds, which amount to about one-third of the total expenditure of the insurance societies. In no other country is assistance given on so generous a scale from public money. In most countries the voluntary insurance societies receive no financial aid from the State, their revenue being derived chiefly from the members' contributions, supplemented by payments, usually on a modest scale, from employers, and by donations, legacies, interest on investments, and receipts from entertainments—in Argentina no less than 35 per cent. of the societies' income is derived from the two last-named sources—but in Belgium, France, Sweden, and Switzerland, as well as in Denmark, valuable subsidies are given to the societies by the central and local public authorities.

It would seem that voluntary sickness insurance tends to develop along the lines followed by compulsory insurance. There is the same tendency towards the organisation of the societies on a territorial basis, the concentration of the membership in a smaller number of societies, and the formation of federations of societies for joint action in negotiating with public authorities, and entering into agreements with doctors and chemists. Similar tendencies may be noted in regard to the benefits given. In voluntary as in compulsory insurance, though with a less rapid development, cash benefits are to an increasing extent becoming relatively less important than the direct provision of medical treatment. Seventy per cent. of the expenditure of the Danish insurance societies is devoted to benefits in kind as against 18·4 per cent. expended in cash benefits. There is a growing feeling that the most important thing to be done for a disabled worker is to restore his capacity to earn wages, and that this end is much more likely to be secured by providing him with the treatment he needs than by the mere payment of money. Treatment benefits have been considerably developed by some societies and include specialist services, institutional treatment, the provision of dentures, artificial limbs, &c. There is also a growing tendency to widen the scope of medical benefits by the inclusion of the dependents of the insured persons. An immense amount of effort is being expended in the promotion of voluntary sickness insurance, but it appears that the prospect for the future is not, on the whole, encouraging. Apart from a few exceptional countries, such as Denmark, voluntary insurance has attracted only a small proportion of the working population. This has been attributed to the natural improvidence of mankind, and also to the insufficiency and precarious nature of the earnings of the low wage workers who are therefore unable to pay regular contributions. But to whatever causes it may be ascribed it seems to be a fact that in most countries a very large proportion of the wage-earners have failed to join provident institutions, and that the failure has been most marked among the poorer workers who stand in the greatest need of assistance in sickness. Moreover, the voluntary societies labour under serious difficulties. Their membership is not constant but tends to diminish considerably in times of economic stress. Their resources, except in the few countries where large public subsidies are given, are limited, and they consequently are at a disadvantage in attempting to make satisfactory arrangements for a good medical service. Their relations with the medical profession in different countries are not always harmonious, and from various parts of the world echoes may still be heard of the "Battle of the Clubs."

Opinion, however, appears to be growing that insurance against sickness cannot be made effective

[1] Voluntary Sickness Insurance: Collection of National Studies. International Labour Office Studies and Reports, Series M (Social Insurance), No. 7. Published in the United Kingdom for the International Labour Office (League of Nations) by P. S. King and Son. 1927. Pp. 470. 8s.

on a large scale without compulsion. This was the decision taken, by a large majority, at the Tenth International Labour Conference in Geneva in June, 1927, and it was confirmed by the International Conference of Unions of Mutual Benefit Societies and Sickness Insurance Funds which was held in Brussels in October, 1927. The decision of the Conference was in the following terms: "The most effective form of systematic provident effort for preventing and remedying the loss of productive power in the workers consists in compulsory insurance, which may be usefully supplemented by voluntary thrift." It would seem that the function of voluntary insurance in the past has been to explore the ground and prepare the way for large national schemes based on the principle of compulsion, and that its function in the future will be to provide means for voluntary thrift supplementing the provision made by compulsory insurance.

PROGNOSIS IN MALIGNANT DISEASE.

THE results of treatment in malignant disease are, on the whole, so unsatisfactory that there is a natural tendency to shirk any attempt at prognosis in individual cases. Every surgeon, of course, can point to instances where his intervention has been completely successful; were it not so, indeed, his task would be intolerable; but he would be the first to acknowledge that his results depend a great deal on factors of which he is ignorant. Of two apparently identical cases, treated in exactly the same way, one may be restored to health, permanently or for a number of years, while the other may terminate fatally in a few months. In attempting to estimate the chances of recovery, the extent of the disease is naturally of the first importance. Involvement of the neighbouring lymph nodes makes the prognosis grave, and further extension makes it practically hopeless. But what is to be said of those cases in which there is no obvious dissemination? It is above all in this group that the position of the surgeon is so difficult. Is he justified in offering the patient the encouragement which is so desirable, or must he still refrain from offering any but the most guarded opinion? Mr. D. H. PATEY and Dr. R. W. SCARFF have attempted to answer the question in reference to that very difficult tumour, carcinoma mammæ, and have brought forward results which are at least encouraging. The number of cases investigated by them is small, being only 50, but, on the other hand, they were all operated on by the same surgeon and were investigated by the same individual, so that variations due to the personal idiosynerasy of the observer is reduced to a minimum; the period elapsing between the operation and the time of recording the result ranges from three to seven years, which is a reasonably long interval, and the records are complete in every case. In estimating the degree of malignancy of the tumours, they have adopted a histological classification based largely on the work of GREENOUGH, and have relied upon the degree of dedifferentiation of the tumour cells and the apparent rate of growth as evidence of malignancy. After careful consideration of all the available facts the tumours were grouped into three divisions according to the degree of malignancy which they were believed to possess, and were then subjected to analysis in the light of the subsequent clinical histories. It becomes apparent from an examination of the data that the authors were justified in their classification, for their figures show a progressive deterioration in the clinical results as the index of malignancy rises. The duration of the disease before the axillary glands become involved is definitely longest in the group of low histological malignancy, and palliative operations give more prolonged benefit even in advanced cases. It is especially in those cases in which dissemination has occurred, but to a moderate degree, that the value of histology in estimating prognosis is best seen. Of ten such patients belonging to the low and medium malignancy groups, four were alive and well at the time the records were taken, whereas of eight patients in the high malignancy group there were no survivors. It is to be hoped that Mr. PATEY and Dr. SCARFF will continue their work, for it seems to be based on sound lines and to have definite possibilities. The experimental study of cancer has shown that individual tumours differ from one another in their biological characters, their rate of growth, and their behaviour on transplantation. There is no reason to suppose that the spontaneous human carcinomata differ from the experimental tumours in all being built to the same pattern; they also have their individual character which is more rigid and of greater importance than the reaction called forth in the tissues of the host. The amount of stroma and the degree of cellular infiltration are of little value in estimating the growth energy of the tumour. It is the malignant cell itself to which we must look for information, and though it may not be permissible to speak of the correlation of structure to function in the malignant growths it is clear that the structure of a carcinoma has a fairly definite relation to its biological activity.

PUNCTATE BASOPHILIA.

THE nature and significance of the little blue points in red blood corpuscles which stain with the nuclear component of methylene-blue-eosin stains in an ordinary dried blood film have been the subject of a good deal of controversy. Found in small numbers in a variety of abnormal bloods, they have long been known to have a special, though not an invariable, association with lead poisoning, and the whole matter is reviewed in the last number of the *Journal of Pathology and Bacteriology* (1928, vol. xxxi., p. 277) by Dr. R. W. BROOKFIELD, of Liverpool, who has worked at the changes produced in the blood by the administration of colloidal lead in the treatment of malignant disease by Prof. BLAIR BELL. An intravenous dose of lead causes an immediate anæmia by the direct action of the metal on the red corpuscles; to this the bone-marrow responds by regenerating red cells, often very actively, and in consequence the circulating blood shows many immature corpuscles which appear as polychromasic cells in dried films, and as reticulated cells if they are stained wet with a vital stain such as cresyl blue. Punctate basophilic (or stippled) cells appear at the same time, roughly in parallel with the polychromasic cells. Dr. BROOKFIELD produces a variety of evidence to show that stippled cells are in fact polychromasic cells altered by the action of lead. All the stages from typical reticulation to typical stippling can be produced by staining fresh regenerating blood with varying concentrations of cresyl blue, and he quotes the pertinent observation of KEY, who showed that lead poisoning produced less punctate basophilia in normal rabbits than in those whose blood contained many immature red cells as the result of repeated hæmorrhages. It seems, indeed, quite doubtful whether stippled cells occur as such in the circulating blood; several observers have noticed in men and animals poisoned with lead that their number

depended on the precise mode of preparation of the blood films, the quickest fixation giving the least punctate basophilia. These facts are much less easy to reconcile with the view that the stipples are the remnants of a fragmented nucleus, and it certainly seems more probable that they are artefacts due to some action of lead on the red corpuscle, though it is curious that no one has succeeded in producing stippling outside the body by mixing any preparation of lead with normal blood or blood containing many polychromasic cells. The association with lead is so intimate that the discovery of punctate basophilia is an important item in the diagnosis of industrial lead poisioning, and its abundance has come to be regarded as the most significant indication of lead intoxication by the Liverpool Medical Research Organisation. But it is, of course, well known that stippling occurs in pernicious anæmia, malaria, leukæmia, and other anæmias, especially those of a toxic origin, and where the products of red cell destruction are retained in the body; NAEGELI found them in his own blood after an orgy of black pudding. But they occur only when regeneration of red cells is going on, and they are not found in aplastic anæmia, or in states of inhibition or depression of the bone-marrow. Immature red cells are therefore a necessity; these may be altered in a variety of conditions in some way which leads to basophilic points being precipitated inside the cells as the blood film is being made; normally the material remains diffuse and gives the appearance of polychromasia.

Annotations.

"Ne quid nimis."

HOUSING CONDITIONS AND INFECTIOUS DISEASE.

IN order to study the relation between bad environment and infectious disease the Medical Research Council recently made an inquiry into measles in the tenements of Glasgow.[1] Dr. J. L. Halliday, who directed the investigation, points out that school is one of the most important factors in disseminating infection, but that school-children are past the dangerous age. The extent to which they will spread the disease among children under two—who are ten to twenty times as liable to die of it—depends very largely upon home conditions. A special study of certain tenements showed that in these buildings children often became infected at the earlier and more fatal ages, whereas a similar study of a housing scheme area, where each house had its own door of entry, showed that measles was far more usually a disease of school age. Figures from other sources agree with this finding. In Birmingham and Renfrewshire, where the people do not live in tenements, only 45 per cent. of all cases of measles occurred under 5 years of age, compared with 58 per cent. in Glasgow and Aberdeen. The Glasgow figures, moreover, are suspected of being too low. The death-rate under 2 is three times as high in Glasgow as in Birmingham, and the death-rate between 2 and 5 is twice as large. Although Dr. Halliday says that age is only one of many factors, and that the difference in the methods of house construction in Glasgow from those in Birmingham may not be even the main determinant of the difference in the respective death-rates, there is sufficient evidence to prove that the tenement system is deplorably wasteful of child life. There is little privacy; families jostle together in the most intimate manner in the common closes and landings, and the common water-closet is an obvious means of contagion. Children under three are generally carried out to sit on the stairhead, at the close mouth, or in the back court; if they get measles the doctor is not sent for, and the attitude of their relatives is completely fatalistic. An interesting by-product of the research was the demonstration of an immunity among presumably susceptible dwellers in a street almost as soon as a highly infective case appeared. This observation is similar to those made by Dr. de Rudder[2] for diphtheria in Germany. The overwhelming majority of persons in a large town, he says, acquire immunity to diphtheria during the first two decades of life, and the denser the population the earlier is this immunity manifested. He also finds that the effect of crowding is to increase the incidence among the youngest children, and hence the total mortality. This is an important, but not the only evil effect of the tenement system, and the facts cannot be too strongly urged on those who have it in their power to ameliorate housing conditions.

[1] Medical Research Council, Special Report Series No. 120, 1928. H.M. Stationery Office. Pp. 34. 1s.

MATERNAL MORTALITY IN CANADA.

A MEDICAL inquiry into maternal mortality was made in Canada during 1925 and 1926, and the results have now been made public in a report[3] published by the Canadian Department of Health. More than 2000 members of the medical profession gave active help in the inquiry, which included records of all deaths of women from 15 to 50 years of age, and the total number of maternal deaths returned was 1532, equivalent to a death-rate of about 6·4 per 1000 living births. It is impossible to assign a specific cause to every death, the contributing conditions mentioned in the returns doubtless overlapping in some cases and being incomplete in others. Puerperal septicæmia was given as causing the death of 418 patients; but since in some provinces the condition is not notifiable, and in others notification is very inadequately carried out, it is probable that this figure should have been higher. Eclampsia and pernicious vomiting were mentioned as causes of death in 242 cases, hæmorrhage in 357, embolus in 87, placenta prævia in 76, nephritis in 80, shock in 63; 136 operations were reported, and 18 letters of advice from physicians expressed the opinion that Cæsarean section was performed too often. Forceps were used in 289 cases. In reply to a question as to the means by which, taking the general circumstances of the patient into account, the physician considered that her life might have been saved, the most frequent answer was "By prenatal care," this occurring 276 times. No prenatal care was given in 1302 cases, and only 12 per cent. of the mothers had anything like effectual supervision before confinement. The term "midwife" in Canada appears to denote an untrained, and usually an incompetent and ignorant woman. The only province in which midwives are licensed by medical authority is Quebec, though Nova Scotia, which permits "any competent female" to practise midwifery elsewhere, makes the curious stipulation that, in order to work in the city of Halifax, she must be trained and certificated. A medical practitioner from Holland reports that the assistance rendered by so-called midwives in Canada, rather than lack of assistance, is often the cause of maternal death, and says that he met with more cases of subacute and chronic puerperal infection in one year in Canada than in 18 years in Holland. Again and again the evidence indicates that lives might have been saved had proper medical care been available; 219 of the women had no medical attendance at birth, and many doctors state that they were not called in until the patient was in labour—sometimes when she was already dying. Generally speaking, maternity has not been treated with the respect it deserves, and letters of advice from the doctors consulted stated that "maternal life has been held in too light esteem."

[2] Deutsche Medizinische Wochenschrift, 1928, i., 385.

[3] Maternal Mortality in Canada. Report of an inquiry, made by the Department of Health, Division of Child Welfare. By Helen MacMurchy, M.D. Ottawa. 1928.

and that "doctors do not take these cases seriously enough." Other reasons given for the high mortality are poverty, with lack of any domestic help; overwork and resumption of employment too soon after childbirth; inaccessibility, no doctor or hospital being available within distances up to 60 miles or more; and expense, patients complaining that when a doctor charges 65 dollars to visit a normal maternity case at a distance of seven or eight miles, they prefer to take long chances. There can be no doubt that instruction about the value of prenatal care is badly needed by the medical profession, by fathers, mothers, and the general public. The bringing of skilled medical attendance to every mother during pregnancy and at childbirth is a more complicated problem, and almost seems to imply a subsidised medical service in some form or other. This solution has been adopted in Saskatchewan, where a municipal service has been started, but the system is there regarded not as a cure, but only as the best available remedy for the prevailing distress.

SUBLINGUAL ABSORPTION OF MORPHINE.

IT is often convenient to give morphine by the sublingual rather than the subcutaneous route, and in order to test the efficacy of this common practice Dr. David Davis and Dr. David Ayman[1] have conducted tests of absorption. A known amount of morphine sulphate was placed beneath the tongue in the sublingual space, and after a given length of time the contents were washed out and the exact amount of drug unabsorbed was estimated by Gauss's colorimetric method, one-fifth to one-tenth of the saliva collected during each experiment being used. In each case control tests were made with equivalent amounts of normal saliva. The experiments showed that morphine sulphate in the form usually given is not absorbed to any important extent by the sublingual mucous membrane, and Davis and Ayman therefore suggest that administration of the drug by this route should be discontinued. They admit, however, that morphine sulphate is rapidly taken up by the gastro-intestinal mucous membrane, and provided that a patient is able to swallow his saliva, the practical objection to the sublingual route seems to be very slight.

USE OF ALCOHOL IN FEVERS.

AT the recent discussion at the Royal Society of Medicine on the ætiology of alcoholism reported in our columns[2] Dr. J. D. Rolleston stated that he had for many years been convinced that the unnecessary prescription of alcohol in the treatment of fevers, not only in the acute stage but also in convalescence, was not infrequently the causes of converting abstainers into chronic inebriates. Acting on this conviction, as he shows in the current number of the *British Journal of Inebriety*, during the last two years that he has been in charge of a fever hospital, he has reduced the annual consumption of alcohol from 2589 oz. of brandy to 25½ oz. without any injurious effect upon the patients. The mortality from diphtheria in which most of the brandy had previously been used was lower in 1927 when none had been given than in any previous year, though the type of disease had remained the same. He further maintains that the total consumption of 25½ oz. of brandy, most of which was used in the treatment of pneumonia and enteric fever, is considerably less than that used daily at some fever hospitals, where the delusion still lingers that alcohol is a cardiac stimulant or is otherwise indispensable. Dr. Rolleston suggests that the administration of alcohol in spite of evidence of its inefficacy or harmfulness is due to the pressure exercised upon the doctor by the patients' friends, who are under the mistaken impression that in the absence of such treatment everything is not being done that can be to save life or hasten recovery. Although such influence is much more likely to be brought to bear successfully in private practice than in institutions, it is not without its effect even in hospital, and was undoubtedly responsible in Dr. Rolleston's opinion for the administration of some of the 25½ oz. of brandy used at his hospital last year. In addition to the reduction in the use of alcohol in the wards Dr. Rolleston has exercised a strict control over its administration by the ambulance nurses attached to his hospital, who have been ordered to give a report of every case in which they considered such administration necessary, with the amount given. The result of this measure was that during the whole of 1927 only 1 oz. and 7 drachms of brandy were used by these nurses. This figure applies not only to the 3223 patients admitted to the hospital in the course of the year, but to all the other cases removed by the ambulance nurses, amounting to a total of over 12,000 persons conveyed, and a mileage of over 68,000.

[1] Arch. Int. Med. 1928, xli., 231.
[2] THE LANCET, April 7th, 1928.

SOME RECENT VIEWS ON ANÆMIA AND RICKETS.

THE current theories on the nature of so-called alimentary anæmias of infancy were reviewed last year in an interesting monograph by Dr. H. Baar, of Vienna.[1] The author, who has done much work on the pathogenesis of these disorders, is unwilling to accept Bunge's iron depôt theory as an explanation of the anæmia of premature infants, or of the great majority of others, though he admits the existence of a rare type, "pseudo-chlorosis infantum," which may be due to a pure iron deficiency. The great majority of infantile anæmias are, in his opinion, influenced by dietetic factors and not by iron, and the greater number of these show some signs of dystrophy. The type of alimentary anæmia selected for special investigation was the so-called goat's milk anæmia, commonly attributed specifically to this mode of feeding. His results appear to disprove the idea that there is any essential difference between this type and cow's milk anæmias; the former were as easily cured by giving *larger* amounts of goat's milk as by a change of diet. Czerny's "fat-injury" hypothesis is held to be refuted by Dr. Baar's investigations, which lead him to the view that the great majority of infantile anæmias are "alimentary-infective." The first stage is a quantitative undernutrition, usually accompanied by signs of dystrophy, but not of anæmia. Consequent to this stage the resistance to common infections (bronchitis, &c.) is reduced, and as a result of this anæmia ensues. The improvement obtained by treatment did not show itself simultaneously in the blood-picture and the nutritive state; that of the former depended on the eradication of the infective condition.

It happens not uncommonly that the exact relation of a symptomatic manifestation to the disease which underlies it is revealed more fully by its response to treatment than by any more direct mode of investigation. A further example of this is provided by the interesting observations which Prof. E. Wieland has published[2] on the anæmia which occurs so commonly in children suffering from florid rickets, and is regarded by some authorities as an essential rachitic symptom. His experience has led him to give the first place in the treatment of florid rickets to "indirect heliotherapy," the use of irradiated ("jecorised") foodstuffs. In this paper a series of cases are described, some of whom were treated with irradiated whole milk and others with dried preparations. Prof. Wieland, unlike Dr. Baar, is strongly impressed with the value of observing Czerny's warning against the use of large quantities of milk, and of keeping the maximum allowance of milk per day below half a litre, or one-tenth of the body-weight. He found that considerably smaller quantities were required in

[1] Pathogenese und Therapie alimentärer Kleinkinderanämien. By Dr. H. Baar (Vienna). Berlin: S. Karger. 1927. Pp. 44. M.2.20.
[2] Direkte und indirekte Lichtherapie der Rachitis. Die rachitisch Anämie, Schweiz. med. Wochensch., Feb. 18th, 1927.

summer than in winter. In the cases described the rapidity of improvement, as shown by the disappearance of symptoms and by alteration of the radiogram, was extremely striking, and greatly exceeded that obtained by administration of cod-liver oil. But the fact by which the author was especially impressed was that no improvement took place in the blood count, more particularly in the percentage of hæmoglobin. This observation was all the more surprising from the fact that various authors have claimed improvement in non-rachitic anæmias as the result of ultra-violet irradiation; it might well be expected that if any form of anæmia responded to irradiation it would be that associated with rickets. As soon as a more varied form of diet was introduced and iron was administered a return of the hæmoglobin towards the normal occurred. Prof. Wieland concludes that this type of anæmia, though an almost constant concomitant of florid rickets, is not an integral part of the metabolic disturbance inherent in this disease; it is merely a secondary anæmia comparable to those which occur in association with many constitutional disturbances of childhood. In another communication [3] the same author reviews the whole question of the ætiology and treatment of rickets, laying particular stress on certain aspects of the disease. In his opinion rickets is common in early infancy and may be diagnosed in the second month. The divergence of opinion between Prof. Wieland and some other authorities on this point is dependent on the interpretation of the significance of craniotabes. Prof. Wieland draws a distinction between a congenital condition (Weichschädel) resembling craniotabes and any form of craniotabes developing after birth; *all* the latter are, he holds, truly rachitic, and the term "physiological craniotabes" is not permissible. He found it to be the rule that by administration of antirachitic foods the occurrence of craniotabes could be averted in children born at full term, but that in premature children, at any rate in those whose birthweight was less than 2000 g., he was not able to avert the development of craniotabes by any form of prophylactic treatment. Consequently he holds the opinion that rickets is an inevitable result of prematurity, though its severity may be greatly reduced by early administration of antirachitic remedies.

In reviewing the present state of our knowledge of the ætiology of rickets Prof. Wieland posits the existence of an endogenous factor, a constitutional predisposition. The exogenous factors are all ultimately referable to lack of vitamin D; in these factors the climatic element is of greater importance than the dietetic. The synthesis of vitamin D occurs as the result of the action of ultra-violet rays on cholesterin. Of the various methods of treatment the use of irradiated milk is perhaps the most universally practicable, while irradiated cholesterin (ergosterol) is the most rapid and effective.

VENEREAL DISEASE CONTROL: AN AMERICAN VIEW.

INTERESTING aspects of the problems and methods of venereal disease control in America are discussed by Dr. John H. Stokes in a recent article.[4] He comments on the European origin of so many important syphilologic discoveries and finds the explanation in the costliness of research in the United States. In Europe, he observes, professional overcrowding and a lower living standard make it possible to secure able workers for a mere pittance; in America, the country of high wages and high standards of living, this is impossible. The American clinician seems to have his whole time occupied by his patients; he has hardly a moment for original effort. Thus to organise an institution for pure research means the collection of a large sum of money. Work upon venereal diseases is particularly costly; the maintenance of laboratories and of animal hospitals on a large scale present a grave financial problem everywhere. Dr. Stokes mentions that, six or seven years ago, he estimated the annual cost of a not particularly pretentious laboratory for this purpose as not less than $30,000; this budget he has reason to think was much below the mark. We think of America as a country where rich men readily endow the pursuit of knowledge; but Dr. Stokes remarks that private wealth cannot readily be interested in an enterprise which bears the stigma of venereal disease, a topic which is socially unacceptable. If the existing foundations make no contribution and if public funds cannot be made available, he looks to the undertakings which make money out of the technical perfection and sale of the products of scientific discovery in the treatment of venereal disease. He is not without hope of the development of a profitable alliance between the concerns which exploit such products and the universities and research laboratories. Dr. Stokes is inclined to criticise American clinical research as too short-sighted. Such research in syphilis, as he observes, takes years, not weeks or months, for consummation, yet records have not always been organised over a long period, nor has the research worker always adhered long enough to a single line of investigation to secure a significant result. This criticism, of course, comes home to other countries besides America, and to a great extent the problems he discusses are familiar here. The greatest weakness in the situation everywhere is what he calls the "inadequate follow-up." Results cannot be properly traced because, according to his estimate, no higher proportion of patients can be kept under observation than from 20 to 40 per cent. "The perfection of follow-up becomes, therefore, one of the critical problems of the syphilis clinic; and social service, through whose aid it is usually done, plus the strong arm of the local public health officials, become two of the most important implements in this field of modern medicine." Dr. Stokes expresses the opinion that the movement for the control of venereal disease was indistinct in England during the war but has made marked progress in the after-years. American effort, on the other hand, he regards as having become particularly effective in the war period but as having subsided later in an atmosphere of reaction and retrenchment. If he would develop his experiences of "the strong arm of local public health officials," he might help us to decide the controversies which have arisen out of the proposals of the cities of Edinburgh and Glasgow.

CHOLEDOCHUS CYST.

Dr. E. S. Judd and Dr. E. I. Greene [1] state that only one example of choledochus cyst was found among 17,381 operations performed on the biliary tract at the Mayo Clinic from 1907 to 1926. The condition is generally held to be congenital. Of the 64 cases on record 52 were in females and 10 in males, while in two the sex was not stated. The average age was 15½ years, but most of the patients did not present themselves until after the symptoms had lasted for from two months to 36 years. The youngest case was in a full-term fœtus reported by Heiliger, and the oldest in a woman of 56, recorded by Reel and Burrell. Usually the symptoms appeared before the age of 10 years, and many of the patients were not more than six months old. The oldest patient was 20 when the first symptoms were noted. In some cases pain was the first symptom, varying in degree from simple flatulence to excruciating colic, requiring morphia for relief. Eating often precipitated an attack. Jaundice, however, was the most constant manifestation in all the cases reported, ranging from a slight yellowish tint to severe icterus. Generally, it was intermittent, but sometimes it was continuous. Acholic stools were the rule in most of the cases observed. The diagnostic sign of chief significance, according to Judd and Greene, is a tumour which

[3] Die Rachitis und ihre moderne Behandlung, Fortschritte der Medizin, June, 1927.

[4] Jour. Amer. Med. Assoc., March 10th, 1928.

[1] Surgery, Gynecology, and Obstetrics, March, 1928.

may be barely palpable, or fill the entire abdomen from the costal margin to the crest of the ilium. According to the literature the diagnosis of choledochus cyst has been made only once before operation—namely, by Neugebauer in 1924. The commonest diagnosis has been echinococcus cyst, and the condition has also been mistaken for pancreatic cyst, stones in the common duct, mesenteric cyst, retroperitoneal cyst, cyst of the liver, generalised tuberculosis, chronic peritonitis, ovarian cyst, and cholecystitis. The chief diagnostic features are recurrent attacks of jaundice with pain in the region of the liver, and the presence of a palpable cystic tumour in the right upper quadrant in a young individual, especially of the female sex. As regards treatment any operation should be performed which allows the bile from the cyst to enter the upper gastro-intestinal tract. External drainage has been fatal in all but two cases, the principal cause of death being hæmorrhage. A case seen by Judd and Greene was that of a girl aged 13 years, who from infancy had suffered from attacks of vomiting and abdominal pain which became more severe as she grew older, in spite of removal of the appendix at the age of 8 years. Jaundice had been present five years previously, and again one year before admission. The stools were clay-coloured in the last attack. A tender movable mass was found in the epigastrium, a diagnosis of cholecystitis, probably calculous in nature, was made, and an operation was recommended. A cyst of the common duct, 13 cm. in diameter, being found, an opening was made for the bile to escape, and choledochoduodenostomy was performed. Recovery was uneventful, and a year later the patient reported that she was in perfect health.

POST-GRADUATE TEACHING IN FORENSIC MEDICINE

DISSATISFACTION is often felt because medical students and practitioners have little opportunity of gaining a sound knowledge of forensic medicine. The Council of the Royal Institute of Public Health has therefore arranged a post-graduate course in this subject to be held at the Institute during the summer. It will be divided into five sections devoted to the subjects of evidence; forensic medicine and toxicology; practical toxicology and biological tests; medico-legal pathology; and crime and insanity. The lecturers on these subjects will include Mr. Roland Burrows, Recorder of Cambridge; Dr. Edwin Smith, coroner for the north-eastern district of London; Dr. E. Goodwin Rawlinson and Mr. A. W. Stewart, D.Sc., assistant directors of the State Medicine Laboratories of the Institute; Dr. Robert Donaldson, lecturer on pathology at St. George's Hospital; and Dr. Norwood East, Medical Inspector of H.M. Prisons. Special lectures will also be given by Mr. H. D. Roome and Mr. Gervais Rentoul, M.P. The courses, which will extend from the beginning of May to the middle of July, are described in a syllabus which may be had from the Institute, 37, Russell-square, London, W.C. 1, and a fee will be charged to cover expenses. General approval will be forthcoming for the enterprise, which will undoubtedly be of great assistance both to lawyers and to medical men who are concerned with medico-legal problems.

A SIMPLE HOOKWORM LARVICIDE.

A SIMPLE and effective method of killing hookworm larvæ is announced from the Research Laboratory of the Department of Sanitation of the Rand Mines, Ltd., Johannesburg.[1] Investigating the spread of hookworm infection among white and coloured miners, Mr. W. O. Fischer, Superintendent of the Laboratory, found so many larvæ in the floors of all the pits that he felt some speedy and effective action was urgently needed. As he was at the time examining fæces by the salt-flotation method, it occurred to him to investigate the effect of strong brine on the larvæ. He found that a 10 per cent. brine shrivelled them within their sheaths and killed them in half an hour, a 20 per cent. brine in ten minutes. Dry salt, 1 lb. to a square yard, with half a gallon of water poured on later, was also found to be effective but slower in its action than brine. Apart from its cheapness, salt has the great advantage of not harming men or equipment. In the mine galleries Mr. Fischer found infection concentrated about the latrines (groups of latrine buckets, standing on a cemented or hard earth base), around which he found larvæ in the floors and walls. Dry kitchen salt was spread on two successive days where the buckets stood and on the floor around; seats and floor were sprayed and washed with 20 per cent. brine, the whole proceeding costing no more than 2*s*. for salt. Tested again after four days the floor and walls were found free of larvæ. To make doubly sure Mr. Fischer now puts an inch of salt at the bottom and another inch at the top of each newly provided bucket before it is taken to the destructor; in these he has never been able to find living larvæ after eight hours. The method is so promising that he is now encouraged to hope he may soon see the mines free from infection. Full details of the experiments are given in the paper, and all who have to deal with hookworm in the tropics would be well advised to give a trial to this simple method of protection.

[1] Archiv für Schiffs- u. Tropen-Hygiene, April, 1928.

AURAL DISEASE AND MILITARY SERVICE.

THAT there is a large amount of aural disease among the general population is a fact once more brought into prominence by the discussion at a combined meeting of the Sections of War and Otology of the Royal Society of Medicine last week (see p. 812). It is to be hoped, and it may be expected with some confidence, that the prophecy of Wing-Commander David Ranken may prove a true one, that the work now being done in school clinics, and the increase in the number of aural specialists in our hospitals, will lessen the sum total of these cases. At the present time, however, aural disease is a serious cause of economic loss to the community: this becomes especially apparent in any large organisation such as the Army, and it is therefore natural that the discussion should have been almost entirely limited to the problem as it affects the Services. Two difficulties in particular arise in connexion with disorders of the ear in military life: the first, alluded to by Mr. T. B. Layton, is that of malingering, for if a soldier with chronic aural suppuration complains of pain around the ear, or of giddiness, it is extremely hard to be sure that he is not suffering from some serious complication, and impossible to insist on his return to duty. The second difficulty, which was touched on by Mr. Sydney Scott, is that of distinguishing those cases which have sustained actual damage to the ears during their term of service from those in which aural disease was already present at enlistment. After the late war there were a great many ex-soldiers in this latter class, and many of them had suffered for years from suppurating ears; but where there was no record of the condition on enlistment, it was often impossible to separate the two classes, with the result that many men received compensation for war injury to which they were not properly entitled. Though there is some difference of opinion about what diseases of the ear should exclude candidates for enlistment, it is indisputable that the ears of every applicant should be examined, and that any defect discovered should be carefully recorded. This would eventually prove, especially in war, to be an economy rather than an expense, but it implies that all medical officers employed on recruiting should have had training in the examination of the nose, throat, and ear, and that there should be enough specialists to whom doubtful and difficult cases can be referred. The regulations for exclusion may well be more stringent in peace-time than in war, and naturally

more so for flying men than for others, on account of the danger of vertigo, and the liability to trouble from sudden changes of atmospheric pressure. On the other hand, Mr. Scott pointed out that men with bilateral perforation of the drum-membranes did successful flying in the war, and were in the fortunate position of not suffering from giddiness when diving rapidly, and Mr. A. R. Tweedie stated that 15 per cent. of the successful force at Gaza had chronic suppurative otitis media. The truth is that there are many different types of suppurative otitis, and that some are more dangerous than others. All medical officers examining recruits should be able to recognise a perforated drum, and should be in a position to refer the applicants to a specialist for final decision.

THE King has appointed Dr. John James Rickard Macleod to be Regius Professor of Physiology in the University of Aberdeen in succession to Prof. J. A. MacWilliam. Prof. Macleod, who is a graduate of Aberdeen, has since 1918 been professor of physiology in the University of Toronto. The part which he played in discovering insulin was recognised in 1923 by the conferment of the Nobel Prize for Medicine upon him in conjunction with Dr. F. G. Banting.

THE Founder's Medal of the Asiatic Society of Bengal has been awarded to Sir Malcolm Watson, in recognition of his anti-malarial work in Malaya.

THE next social evening of the Royal Society of Medicine will be held at 1, Wimpole-street, W., on Monday, May 7th. Sir James Berry (the President) and Lady Berry will receive the guests at 8.30 P.M., and at 9.15 Mr. P. B. Tustin will give an illustrated address entitled Milk—from Cow to Consumer.

Summer Time will commence in Great Britain, Ireland, the Channel Isles, and the Isle of Man, next Sunday morning, April 22nd, at 2 A.M., when the hands of timepieces should be advanced one hour. It will end on Sunday, Oct. 7th.

WE greatly regret that a note appeared in THE LANCET of last week announcing, on erroneous information, the death of Dr. I. A. Davidson of Belfast. Dr. T. A. Davidson, of the same city, who died on March 28th, was his cousin.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lts. E. O'Reilly to *Victory*, for R.M. Infirmary, Portsmouth, and E. S. Bolton to *Constance*.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. A. E. B. Wood, Reg. Army Res. of Off., to be Maj. whilst re-employed, and relinquishes the rank of Lt.-Col.

Maj. E. C. Stoney is re-employed.

ROYAL AIR FORCE.

Flying Officer P. H. Perkins is granted a permanent commission in this rank.

INDIAN MEDICAL SERVICE.

Capt. Abani Mohan Ghosh to be Maj.

Lt.-Col. J. A. Shorten retires.

Lt. Shanker Parashram Joshi to be Capt.

Temp. Capt. Samuel Mufty and Temp. Lt. Satya Raju Chittoory resign their temp. commissions.

ARMY DENTAL CORPS.

Seven commissions in the Army Dental Corps will be offered next month. Candidates must be unmarried, under 28 years of age, and must hold the degree or licence in dental surgery of a British University or recognised licensing body, and be registered under the Dentists Acts. Intending candidates should make application, not later than May 7th, to the Under-Secretary of State (A.M.D. 1), the War Office, Whitehall, London, S.W. 1.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCLXXII.—THE TREATMENT OF CANCERS OF THE SKIN.

IT is essential before considering the treatment of cancers of the skin to have a clear conception of the varieties of skin carcinomata, and to be able to recognise them at an early stage. On neither of these important points is much assistance to be had from text-books.

In this country cancers of the skin are usually divided into two main groups: (1) squamous carcinoma; (2) basal carcinoma. The former arising from the prickle cells of the epidermis is spoken of as an epithelioma. When well established it grows rapidly, involves the neighbouring lymphatic glands, and produces metastases in the internal organs. It is rightly considered as being "generally malignant." Whilst the latter, arising from the basal cells of the epidermis, is termed a rodent ulcer because sooner or later it usually undergoes ulceration and if untreated may involve the deeper structures without however invading the lymphatic glands or producing metastases. Hence this, the commoner form, is regarded as being "locally malignant."

Squamous Carcinoma.

The first evidence of an epithelioma is a local infiltration of the skin with central thickening or keratosis. This can be observed when the tumour is no larger than a pin's head, and at first glance suggests nothing more than a plugged follicle. If, however, we excise it and examine it at this stage, we find that the apparent plugging is due to an increase of the keratin layer. A slightly older growth, of two to three weeks' duration, gives a tumour of the size of a small pea, raised above the surface of the skin, of the colour of the skin, with a rose-tinted base due to dilated venules and presenting in its centre hyperkeratosis. If the skin is put on the stretch the periphery of the tumour may appear translucent. The growth is firm, though not necessarily indurated, can be felt to be invading the true skin, and is freely movable in the skin; the tumour has not been invaded by pus cocci; there are no signs of inflammation around it and its contents cannot be extruded by ordinary pressure. The neighbouring lymphatic glands are not involved, and at this stage the epithelioma is quite benign.

Differential Diagnosis.

From what have we to differentiate it in arriving at our diagnosis? Photographically it may simulate: (1) an early basal carcinoma; (2) a small boil; (3) a molluscum contagiosum; (4) a small sebaceous cyst; (5) a mole or (6) a simple wart.

An early non-ulcerated basal carcinoma has a more translucent appearance than a squamous carcinoma. Its centre shows no keratosis, but gives the appearance of a slight depression. The tumour is softer and does not infiltrate the true skin to the same extent. It usually takes two *years* to attain the size of a two *weeks*' epithelioma.

A small boil invariably gives us evidence of inflammation, its necrotic centre exudes pus, and on trying to raise it from the skin it is found that there is infiltration of the dermis for some considerable area around the protuberance. A difficulty arises, however, when the epithelioma has become infected. Such a case was sent to me a short time ago as a rodent ulcer. The lesion was so masked by the super-added infection that though it was easy to exclude rodent ulcer with the history of but three weeks' duration it was not evident that we were not dealing with an infected granuloma. A week's

treatment cleared away the infection and revealed a typical squamous carcinoma.

The tumour of molluscum contagiosum is usually multiple, but even when solitary it can readily be excluded. It is translucent, umbilicated, and soft. Its caseous contents of molluscum "bodies" can easily be expressed. It is more frequently situated *upon* the skin rather than *in* the skin.

A small sebaceous cyst is yellowish-white, translucent, and soft. It does not infiltrate the skin, and, on puncturing, its sebaceous contents can be expressed.

The history, colour, presence of downy hair and softness of the mole should be sufficient to exclude it, whilst the wartiness of its whole surface and the absence of infiltration should rule out the common wart.

Consideration of the above points explains why epitheliomas have, not infrequently, been described as originating in moles, warts, wens, "powkes," cysts, and boils. I have frequently seen cases in which the diagnosis has been missed because due consideration has not been given to their differentiation, and even at times when I have demonstrated what appeared to me to be a typical early epithelioma I have only convinced my audience by subsequently exhibiting a section of the growth. It seems as if it were difficult to realise that such a small innocent-looking tumour is in reality a carcinoma which, if maltreated or untreated, may become highly malignant.

It is not easy to foretell how rapidly the early lesion may progress, nor how soon the lymphatic channels may become invaded, nor yet what character it may assume later, whether superficial or deep, discoid, cauliflower, crateriform, or fungating. It is certain, however, that the less invasion there is of the true skin, the less malignant will the growth be.

Basal Carcinoma.

I have described above the general picture of an early basal carcinoma. The term rodent ulcer is misleading, for a large proportion of these growths are not ulcerated, though they may have been growing for many years. I wish therefore to emphasise the multiformity of basal carcinomas. Clinically, we recognise the following types: (1) superficial-cicatricial; (2) hypertrophic; (3) cystic; (4) morphœiform; (5) pedunculated; (6) nodular and indurated; (7) scirrhous.

When, however, ulceration supervenes and becomes well established, the multiformity is lost in the more uniform picture of the rodent ulcer with its uneven surface, covered by a glairy or hæmorrhagic discharge and its irregular rolled edge, which by gradual erosion may destroy muscle, cartilage, periosteum, and even bone. Fortunately this advanced picture, too often seen 20 years ago, is rarely met with to-day; due no doubt to its earlier recognition and to the more modern methods of treatment.

The *superficial-cicatricial* type is easily the commonest variety; it spreads eccentrically, cicatrizing in parts, leaving scattered nodules within an area (the surface of which often presents a rosaceous tint due to dilated venules) bounded by a well-marked raised gelatinous-looking ridge. The multiple basal carcinomas of the trunk, which are often mistaken for lesions of seborrhœa, psoriasis, lichen planus annularis, or Bowen's precancerous dermatosis, are usually of this variety.

The *cystic* type must be differentiated from sebaceous cysts and lupus vulgaris. The *nodular*—arising from the basal cells of the hair follicles—and the *schirrous*—arising from the basal cells of the sebaceous glands—are not infrequently diagnosed as epitheliomas on account of their induration, but the history of many years' duration should negative this.

Age Incidence.—Multiple Growths.

Though the incidence of cancer is much greater after middle age, one should not let the youth of the patient deter one from making a positive diagnosis. I have frequently seen epitheliomas and rodent ulcers in patients under thirty years of age. Two further points call for mention. If a patient presents a carcinoma on the face, the whole surface of the body should be examined for further growths and the patient kept under observation for years afterwards to note the possible development of further lesions. Multiple growths are far commoner than is usually supposed.

Methods of Attacking the Growth.

Excision.—The treatment of early carcinomas, whether squamous or basal, which I invariably adopt and advise is excision. It can easily be done under a local anæsthetic by the practitioner. It is not necessary to sacrifice more than one-sixth of an inch of the surrounding tissue, nor to dissect out the neighbouring lymph glands, but it is essential to remove the whole thickness of the skin and thus to get *beneath* the growth.

Diathermy.—Epitheliomas of more than six weeks' duration, in the absence of lymphatic invasion, I prefer to remove by means of the diathermy knife. By this method the neighbouring lymphatics and blood-vessels are sealed and the chance of recurrence or of dissemination of the cancer cells is very greatly diminished. If, however, the glands are suspected of being involved block dissection by a surgeon is indicated.

Curetting followed by X Rays.—For basal carcinomas, other than the smallest, my method of treatment for the last 25 years has been curetting followed by X rays. The cosmetic result is excellent and "recurrences" very rare. Under a local or general anæsthetic (if necessary) I thoroughly curette the new growth, using adrenalin to stop the oozing, and then apply pure resorcin to the blanched surface, since resorcin has a selective action on epithelial cells. The ulcer is then exposed to a pastille dose of X rays, which is repeated on the two following days. Boric ointment dressing should be applied to the lesion till the ulcer has completely healed, and the patient should be kept under observation for a period of at least two years. So satisfactory has this method proved that I have seldom resorted to other means. Where there is any doubt as to the diagnosis or where it is suspected that the tumour may be a mixed squamo-basal growth, then I would most certainly deprecate curetting and advise excision.

Solid Carbon Dioxide.—The more superficial the basal carcinoma—e.g., those on the trunk—the less readily do they respond to the X rays alone. Hence many workers prefer to use solid carbon dioxide for this type of growth. In the hands of the expert it answers well, but I have had so many rodent ulcers referred to me which have been unsuccessfully treated by solid carbon dioxide that I hesitate to advocate its use. The apparent reason for failure is that it has not been applied long enough nor with sufficient pressure to produce total destruction of the diseased tissue. The cosmetic result is not always satisfactory.

Radium, in the hands of the radium expert, is a most useful method of treatment at any stage of the carcinoma. The resulting scar is supple and usually devoid of telangiectases. Recurrences are few. I have used it for small growths and for recurrent nodules with satisfactory results.

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THE NURSES' CO-OPERATION.—The annual report of this co-operation for the year 1927 shows continued prosperity. The gross receipts from patients amounted to nearly £54,000, of which sum over £50,000 was paid to nurses, while the income of the society derived from commission on fees earned by nurses, together with interest, was £3370. The number of nurses on the staff was 382 and 2637 cases were nursed during the year.

Special Articles.

FRACTIONAL TEST-MEALS.

ANALYSIS OF RESULTS OBTAINED IN ONE HUNDRED AND SIXTY CONSECUTIVE TESTS.

BY LUCY WILLS, M.B., B.S. LOND.,
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THE work of T. I. Bennett, and J. A. Ryle and others of the Guy's School, has brought Rehfuss's fractional test-meal method into evidence in England, and it is now used in many hospitals as a routine method of examining suspected gastric and duodenal cases. The following paper is a brief report on 160 test-meals and an attempt to evaluate the method as a routine test. I wish to acknowledge my indebtedness to the above authors, whose conclusions largely guided me in reporting on the findings. No attempt has been made to review the literature or describe the methods used.

The cases examined were selected by the clinical staff, and none was omitted from the series save those who vomited during the meal, those (a few only) with very excessive salivation, and those spoilt through some accident (e.g., a case of suspected duodenal ulcer with apparently complete achylia and failure of motility—subsequently found to be taking large doses of belladonna). In all 20 cases were excluded. Acidity is expressed as a percentage of decinormal solution and refers to free acidity (Töpfer's) unless otherwise stated. The following limits have been used to define normality, hyper- and hypochlorhydria, &c.:—

		Per cent.	
Low normal ..	Free acid	10 to 20	0·1 normal NaOH.
Average normal ..	,, ,,	20 to 40	
High normal ..	,, ,,	40 to 50	
Range of normal ..	.. ..	10 to 50	
Achlorhydria ..	No free acid ..	..	Normal chlorides.
Hypochlorhydria	Free acid less than	10	0·1 normal NaOH.
Hyperchlorhydria	,, ,, more than	50	
Achylia	No free acid and very low chlorides.		

Total and mineral chlorides were estimated in a large proportion of the meals, but are not considered in the present discussion except to diagnose achylia from achlorhydria due to excessive neutralisation.

It was assumed for purposes of reporting that the cases examined were suffering from some gastric or duodenal lesion, either organic or functional. Certain findings (some compatible with normality) therefore suggested certain lesions, though the absence of such findings was never held to indicate the absence of a lesion, with the exception of those typical of new growth and pernicious anæmia. These findings can be grouped under three headings: (1) findings suggestive of juxta-pyloric ulceration, (2) findings suggestive of new growth, and (3) findings suggestive of pernicious anæmia.

Findings Suggestive of Juxta-pyloric Ulceration.

A curve of free acidity above 50 per cent. (cases giving single values just above 50 per cent. being excluded) was considered suggestive of juxta-pyloric ulceration, particularly of duodenal ulcer when the rise was rapid, with rapid emptying and continued secretion. No real attempt, however, was made to diagnose ulcers of the duodenum from ulcers occurring at or just on the gastric side of the pylorus. It must be remembered, however, that, without symptoms, such a curve of hyperacidity in no way suggests a lesion, as it is found in 8 per cent. of healthy men and in functional conditions. No attempt was made to diagnose gastric ulcer other than juxta-pyloric by the test-meal findings.

Findings Suggestive of New Growth.

The diagnosis of new growth was made almost entirely on the resting-juice. A foul-smelling, thick resting-juice containing charcoal from overnight, food debris, altered blood, pus, and organic acids was considered absolutely diagnostic. In less marked cases the presence of altered blood in appreciable quantities was considered good grounds for the diagnosis. Some charcoal was nearly always found, however little resting-juice might be obtained. Fresh streaks of blood and swallowed blood (bad teeth and gums) were ignored. The presence of a low or achlorhydric curve was regarded as confirmatory of the diagnosis, but the occurrence of a completely normal curve did not exclude the diagnosis of new growth. The presence of lactic acid (McLean's test) has not been found of diagnostic significance in this test-meal and was not relied upon.

In any case of obstruction food debris, charcoal, and organisms will be found in the resting-juice, but in simple obstruction I rarely found altered blood, except after a recent hæmorrhage. Also in simple obstruction the volume of resting-juice was generally larger and the charcoal not so intimately mixed.

Findings Suggestive of Pernicious Anæmia.

The curve considered typical of pernicious anæmia is one showing complete achlorhydria (low chlorides and rapid emptying). It is said to occur in 4 per cent. of normal people and is frequent in various pathological conditions besides pernicious anæmia. No attempt was made to diagnose other clinical entities, but an indication of the state of the secretory and motor functions was given by a detailed report on the findings.

Test-meal Findings.

In the following review of cases examined the test-meal results are correlated with the operative and the X ray findings, with a view to determining the value of this examination as an aid to diagnosis and treatment, and as an indication for or against certain operative procedures. The actual findings are given here, but the discussion of their value is reserved till later in the paper. The cases are divided for convenience into medical and surgical groups, which are again subdivided according to the operative or clinical findings.

Surgical cases, subdivided according to the lesion found at operation.

1. *Duodenal ulcers.*—Thirty cases occurred in this series, 26 males and 4 females. In 17 of the cases, 16 men and 1 woman, the test-meal findings were such as to have been described above as typical of juxta-pyloric ulceration. In some of these the stomach emptied rapidly (¾ hour) and there was a continuous secretion. In the remaining 13 cases the findings were atypical. The average emptying-time of the whole series was 1·9 hours, the range ¾–2½ hours.

Unfortunately these cases were not all examined radiographically by the same observer. In all 25 cases were examined, and of these 17 were correctly diagnosed and 8 incorrectly. One observer made 10 correct and 1 incorrect diagnoses, but these were selected cases sent from another hospital and so do not represent his real error. There was no relation either in this or any of the other series between correct or incorrect X ray diagnosis and typical or atypical test-meal findings.

2. *Gastric ulcers.*—Twenty-three cases: 17 males, 6 females. These must be divided into those with pyloric or juxta-pyloric ulceration, which should typically show a curve of hyperacidity, and those with ulceration of the body remote from the pylorus, which are not characterised by any definite curve of gastric acidity.

There were 14 cases of juxta-pyloric ulceration: of these 8 had typical findings, 5 had marked obstruction, and 1 gave atypical findings—i.e., the true surgical conditions could be inferred in 13 out of 14 cases. Nine cases had ulceration of the body away from the pylorus: of these 2 gave hyperchlorhydric curves and the remaining 7 normal or low curves. The average emptying-time for cases without marked obstruction was 2 hours, and the range 1½–2¾ hours.

3. *No gastric or duodenal lesion.*—Twenty-eight cases: 14 males, 14 females. The cases in this group, with a single exception which was diagnosed as a case of gall-stones, were clinically considered to have symptoms sufficiently suggestive of a gastric or duodenal lesion to warrant a test-meal examination, but no gastric or duodenal lesion was found at operation. The actual findings were: 7 cholecystitis or cholelithiasis, 7 cases nil found in abdomen, and 1 case ovarian tumour (!). Thirteen cases had their appendices removed, but frequently this organ appeared in no way abnormal!

The test-meal findings in this series were 23 normal or subnormal curves, which, though in no way excluding either gastric or duodenal ulceration, did not suggest juxta-pyloric

ulceration, and 4 hyperchlorhydric curves suggestive of juxta-pyloric ulceration (one of these curves was from a gall-bladder case). One case of gall-stones had a resting-juice typical of a new growth; at operation nothing was found to account for the obstruction, which was apparently reflex in origin; the altered blood in the specimen was not accounted for. The patient has been seen again 18 months later; she is still vomiting and complains of gastric pain; there is a large mass in the pelvis. The average emptying-time for this series was 2 hours, range 1¼–2¼.

Twenty-two of the cases had an X ray examination. Twelve showed no gastric or duodenal abnormality, 7 were thought to have pyloric or gastric ulcer, 2 new growth, and 1 a duodenal ulcer.

4. *A single case* will be discussed here, as it is difficult to place it in any class, though it resembles the one reported in some detail in the previous group. The patient, a female, had previously had an operation for apparent pyloric obstruction (symptoms vomiting and pain, X ray delay up to 48 hours). At operation the gall-bladder was removed for stone and a thickened but not obstructed pylorus was noted. X ray a year later showed no delay. Two years later the patient returned with symptoms of obstruction (vomiting, marked loss of weight). On examining the resting-juice, findings typical of obstruction were noted, the presence of altered blood suggesting malignant disease. At operation nothing was found in the stomach and a normal appendix was removed. Eight months later this patient again returned complaining of persistent vomiting. An X ray examination and clinical observation in the ward demonstrated a delay of over 24 hours. At operation adhesions, but a perfectly patent pylorus were found. Finney's operation of gastro-duodenostomy was performed. A post-operative test-meal done 10 days later showed food retention from the day before. This and the previous case are of interest as examples of reflex obstruction, both in cases of gall-stones and both persisting after the removal of the gall-bladder

5. *Malignant disease.*—Fourteen cases: 5 male, 9 female. This small series is of interest as, in my opinion, it constitutes the justification for a test-meal examination in cases with vague gastric symptoms. Two cases in this series had test-meals because the resident medical officer could not think of anything else to do; the diagnosis resulted from this chance, and these two cases were among the four that were operable in the series. The test-meal findings were typical in all cases but one. This case, a man, aged 64, had marked obstruction, but there was a very large volume of highly acid (90 per cent.) resting-juice and no altered blood. The pathologist's report on this case was: "Malignant ulcer of the pylorus of curious type, very localised, and other parts of the stomach very little affected."

The positive diagnosis was correct, therefore, in 13 out of 14 cases. Three cases were wrongly diagnosed as malignant: 2 have been reported in detail; the third case, which had a typical resting-juice and occult blood in the stools though there had been no recent hæmorrhage, was found at operation to have an hour-glass stomach with a large ulcer on the posterior surface, which was adherent to the pancreas. The radiologist had correctly diagnosed the condition, but the surgeon thought, on the history, that the case was probably malignant.

The emptying-time was not determined in many cases, as only the resting-juice was examined, but the average time was 1·84 and the range ½–2¾. The average in a larger series would probably be higher, as this series included two cases of leather-bottle stomach that emptied very rapidly.

X ray examination was made in 11 cases; in 8 the correct diagnosis was made, in 2 simple obstruction was reported, and in 1 nothing abnormal was discovered; the three latter all had new growth at the pylorus.*

The diagnosis was clear clinically in nearly all the cases, but in 2 cases it rested on the test-meal findings alone.

Post-operative Test-meals.

Sixteen of the gastric and duodenal cases reported above had post-operative test-meals done within a fortnight of their operation.

Six gastric cases.—After partial gastrectomy and gastro-jejunostomy five of these cases had no free acidity and one a free acidity of 18 per cent. (pre-operative value 44 per cent.). Bile regurgitated freely in all and the emptying time was decreased, with the exception of the case mentioned above in which the stomach was not empty at two and a half hours either before or after operation. Only one of these cases had a high acidity before operation, and none emptied rapidly.

Nine duodenal cases had post-operative test-meals. Three had gastro-jejunostomy performed; the result was free regurgitation of bile and reduction of emptying time, but there was free acidity in all three cases, the maximum acidities before and after operation in the three cases being respectively 48 and 20 per cent., 112 and 28 per cent., and 40 and 40 per cent. The case with high acidity before operation emptied rapidly both before and after operation.

Six cases had a Finney's gastro-duodenostomy, and their after-results are of some interest. The change of maximum acidity was respectively 50 to 26 per cent., 90 to 62 per cent., 48 to 54 per cent., 28 to 32 per cent., 62 to 58 per cent., and 70 to 60 per cent.—in no case a marked reduction and in two cases an actual increase of acidity. The emptying time was increased after operation in all cases but one, and in some the delay was very marked. Two patients had appreciable quantities of food debris in their resting-juices after the operation though not before; in neither was the stomach empty when the post-operative meal was ended. Another case, mentioned above, had a large volume of resting-juice containing much food debris, indicating a marked degree of obstruction. Regurgitation of bile occurred in all but two cases. The failure to obtain a marked reduction in acidity and the increase in emptying time noted in all but one case are in marked contrast to the results obtained in gastro-jejunostomies. The fact that there is improvement in symptoms would suggest that acidity is not the major factor in preventing healing.

Non-surgical Cases.

The cases reported below had a test-meal given either because of gastric symptoms or, in the case of anæmias and in certain cases of rheumatoid arthritis, to investigate their gastric functions for therapeutic reasons.

The cases may be divided into two groups—viz., (1) those with either gastric or duodenal symptoms, and (2) those with some general condition.

1. Eighteen cases (4 male and 14 female) had symptoms suggestive either of a duodenal ulcer (2 cases) or of some simple gastric lesion. The test-meal findings can be divided into—normal, 10 cases; achlorhydria, 4 cases; and hyperchlorhydria, 4 cases. The large proportion of achlorhydrias is of interest, especially as all 4 cases were of the achylic type; their symptoms improved on treatment with hydrochloric acid. The average emptying time was 1·7 hours, range ¾ to 2¾ hours.

Thirteen of the cases were X rayed: 8 were reported normal and 5 had either gastric or duodenal ulcer.

The clinical diagnosis was: duodenal ulcer, 2 cases; gastric ulcer, 10 cases; alcoholic cirrhosis, 1 case; gastritis (influenzal, &c.), 2 cases; dyspepsia due to dental caries, 1 case; and gastric neurosis, 2 cases.

Both the duodenal cases had normal test-meal findings, but the case that was X rayed showed a duodenal ulcer. The 4 cases of hyperchlorhydria were all diagnosed gastric ulcer, and the 3 that were X rayed showed a pyloric ulcer. The other 6 cases diagnosed gastric ulcer included the 4 cases of achlorhydria and 2 normal curves. The case of alcoholic cirrhosis gave a low normal curve with excess of mucus, and the X ray was negative.

All improved under treatment and were discharged. Two cases, both women, were examined for the possibility of a new growth of the stomach; both gave normal test-meal and X ray findings. One was probably a new growth of the bile passages; the other was never definitely diagnosed.

2. The non-gastric series consisted of 14 cases of anæmia and allied conditions, 6 cases of rheumatoid arthritis, and 7 cases of general debility.

* Since writing the above I have examined two more cases of new growth, one male and one female. The former had typical findings and at operation an inoperable growth causing marked obstruction was found. The latter case had normal test-meal findings with the exception of pus in the resting-juice; at operation most of the stomach and the first part of the duodenum was removed. The growth was small and localised at the pylorus (no obstruction), and the mucous membrane of the stomach was unaffected, except at one point on the pylorus where the growth was just ulcerating through.

The cases of anæmia can be subdivided into: (*a*) 3 cases, males, of pernicious anæmia; (*b*) 2 girls, children of one of the men in (*a*); (*c*) 2 cases of anæmia of pregnancy of the pernicious type; (*d*) 1 case, female, achylia 20 years ago (Pavlov); and (*e*) 6 cases, 3 males and 3 females, of severe secondary anæmia.

The gastric curves of the individuals in groups (*a*), (*c*), and (*d*) were all similar and of the achylia gastrica type—i.e., no free acid, low chlorides, and rapid emptying (average time 1 hour, range ¾–1¼ hours). The 2 cases in group (*b*) gave curves with no free acid, but the total acidity had maximum values of 15 and 20 per cent. respectively, and both emptied more slowly than the cases in the above groups. The 6 cases of secondary anæmia showed nothing of interest in their test-meals, the range of acidity and emptying time (average 2·1 hours) falling within normal limits. The cases of rheumatoid arthritis, 2 males and 4 females, gave 2 curves of the achylic type, 2 low, and 2 average normal curves. The average emptying time was 1·83 and the range 1–2½ hours. The 7 cases of general debility, 3 male and 4 female, all gave normal curves, with the exception of one, who gave an achlorhydric curve with rapid emptying and a large excess of mucus.

Table I. is drawn up from the cases reported in this paper that had a complete examination, and

TABLE I.—*Percentages.*

Figures in italic (on top or alone), Ryle's.
Figures immediately below, own series.

Condition.	Number of cases.	Achlorhydria.	Hypochlorhydria.	Low normal.	Average normal.	High normal.	Hyperchlorhydria.
Normal (Bennett and Ryle).	*100*	*4·0*	*1·0*	*10·0*	*59·0*	*18·0*	*8·0*
Duodenal ulcer.	*34*	*0·0*	*0·0*	*11·7*	*8·8*	*26·4*	*53·0*
	30	—	3·0	—	30·0	13·3	53·3
Gastric ulcer. Confirmed cases.	*24*	*4·1*	*12·5*	*16·6*	*20·8*	*25·0*	*20·8*
	21	0·0	4·0	4·0	30·4	4·0	48·0
New growth.	*10*	*30·0*	*30·0*	*20·0*	*10·0*	*10·7*	*0·0*
	12	50·0	25·0	—	17·6	—	8·0
"Appendicitis."	*13*	*23·0*	*0·0*	*7·6*	*38·4*	*7·6*	*23·1*
	13	16·6	—	16·6	38·8	16·6	11·1
Gall-stones.	*7*	*14·2*	*0·0*	*0·0*	*57·1*	*14·2*	*14·2*
	5	—	—	20·0	60·0	—	20·0
Pernicious anæmia.	*6*	*100·0*	—	—	—	—	—
	3	100·0	—	—	—	—	—
Rheumatoid arthritis.	*8*	*37·5*	*12·5*	*12·5*	*0·0*	*0·0*	*37·5*
	6	33·3	—	33·3	33·3	—	—
Secondary anæmias.	—	—	—	—	—	—	—
	6	33·3	—	16·6	33·3	16·6	—

from figures taken from Table V. in Ryle's [1] book. Its moral is the folly of giving percentage values from such limited series, in which one case will alter the values to such a marked degree.

Summary.

To sum up, the reported findings will be considered from the following points of view: (1) their diagnostic and therapeutic significance; (2) their significance from the point of view of (*a*) the secretory, and (*b*) the motor function of the stomach; (3) sex incidence.

It cannot be too emphatically stated that, with the exception of new growth of the stomach, the test-meal examination gives very little help in diagnosis. In medical conditions such as pernicious anæmia the diagnosis rests upon other examinations. In the surgical conditions other than new growth, a good X ray plate gives far more valuable information. In confirmed cases of gastric and duodenal ulcer the chances are practically equal that the test-meal findings will be the so-called typical ones or normal (or subnormal), so that the fact that the gastric curve is normal will not rule out these conditions. Further, a hyperchlorhydric curve without symptoms in no way suggests a lesion. However, given that the patient under examination has gastric or duodenal symptoms, a curve of the hyperchlorhydric type, if it occurs, is strongly in favour (a 5 to 1 chance) of some juxta-pyloric lesion, though this type of curve may be found (albeit far less frequently) in cases of gall-bladder disease or appendicitis. This is clearly seen in the series of patients in whom no lesion was found surgically, although one was diagnosed clinically. Of these, only 5 out of 28 gave a hyperchlorhydric curve.

It is difficult to sum up the X ray findings, as the examinations were made by different observers. It would appear that a radiologist who specialises in abdominal work can make a positive diagnosis in a large number of cases of duodenal ulcer, though the diagnosis is not so easily made in gastric cases. It would appear therefore that the tendency of certain surgeons to depend more and more on radiographic and test-meal examinations for making their diagnosis is not justified. Undoubtedly a good X ray examination can in many cases decide the diagnosis, but a test-meal examination is only rarely of diagnostic significance. Positive test-meal findings may be helpful, but there are so many gastric and duodenal cases with proved lesions in which the test-meal findings are completely negative that they seem of small value as a routine examination. Further radiographical and chemical work will advance the diagnosis of gastric, duodenal, and other abdominal lesions, but there still appears to be a large field for clinical study.

As a guide to treatment the claims of the test-meal are stronger, as it gives definite information as to the secretory and motor functions of the stomach, which may be disordered apart from any organic lesion. It is argued that a single test-meal can give little information of value as regards the secretory function, as nervous and other influences will render the findings variable; the curve of acidity, however, is not greatly altered in repeated test-meals, but remains of the same type. The findings are of use, therefore, therapeutically, as the beneficial effect of hydrochloric acid medication in achlorhydric cases clearly demonstrates.

The motor function, as judged by the emptying time, is probably more accurately gauged by the fractional test-meal method than is the secretory function. Table II. shows that, except in pernicious anæmia, the variation in emptying time is not related

TABLE II.—*Rate of Emptying of Gruel Meal Relative to (1) Clinical Condition and (2) Type of Curve.*

Clinical condition.	Average emptying-time in hours.	Type of curve.		Average emptying time in hours.
Duodenal ulcer ..	1·9	Achylic.		0·86
Gastric ulcer ..	2·0	Achlorhydric.		1·77 } 1·39
New growth ..	1·84	Hypochlorhydric.		1·50
Abdominal symptoms, no gastric lesion	2·0	Low	Normal.	1·80
		Average		2·01
Non-surgical gastric or duodenal cases	1·7	High		2·06
Pernicious anæmia and allied conditions	0·96	Hyperchlorhydric.		2·12
Second anæmias ..	2·1			
Rheumatoid arthritis	1·8			
Debility	1·8			

to any clinical entity, but is apparently related to the degree of acidity, since the emptying time increases as the average acidity rises. This, according to the findings of J. M. H. Campbell, and J. J. Conybeare,[2] is the reverse of what happens with the heavy barium meal. The determination of the emptying time in relation to secretion is important, because the findings give an indication of the type of operative procedure to be used. In the present series, broadly speaking, three kinds of operation were done for the gastric and duodenal cases—gastro-duodenostomy

gastro-jejunostomy, and gastro-jejunostomy with a partial gastrectomy. The first operation (Finney's) was only done in cases of duodenal ulcer and in one case of spasmodic obstruction; the after-results of this operation are still in dispute, but if the object of the operation is the same as in gastro-jejunostomy—i.e., to decrease gastric acidity by free regurgitation and to increase the rate of emptying—it is not remarkably successful. In no case examined post-operatively was the acidity found markedly decreased, and in several cases it was actually higher. In not a single case was the emptying time decreased. In one case it remained the same and in the others it was actually increased; in fact, in three cases there was still food debris in the stomach after 12 hours' fasting. Gastro-jejunostomy, with or without a partial gastrectomy, was performed on all the remaining gastric and duodenal cases. According to Ryle,[3] in cases with a short history, whose test-meal results show a rapid rise of acidity to a high level and rapid emptying, the operation is contra-indicated, as it frequently fails to produce a lowering of the acidity, and the stomach already empties too rapidly. In the present series all cases, whatever their previous emptying time and acidity curve, showed a marked reduction in acidity after operation. A further examination of their gastric function at a later date would be of interest.

The ratio between the sexes in the cases considered is: duodenal ulcer, 6·5 males to 1 female; gastric ulcer, 2·8 males to 1 female; new growth, 0·6 males to 1 female. Comparing these figures with the death-rate (Registrar-General's figures) from the same diseases, which show respectively a ratio of 4·8 to 1, 1·9 to 1, and 1·2 to 1, there is, with the exception of the small series of new growths, a preponderance of males in this series. This is the more remarkable as in this hospital there is always a large preponderance of female patients.

In conclusion, I should like to thank the members of the staff for permission to report their cases.

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SOME EFFECTS OF

ALTERATION OF OXYGEN PRESSURE

IN THE INSPIRED AIR UPON CANCER GROWTH AND BODY-WEIGHT OF RATS AND MICE.

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THE recent researches of Warburg and his collaborators upon the metabolism of tumour cells have shown that these cells can metabolise glucose for a considerable period in the absence of oxygen, and that even their normal metabolism includes both aerobic and anaerobic processes. Warburg [1] also showed that, since cancer cells can derive energy by two different processes of metabolism (respiration and fermentation), it is necessary to interfere with both these processes if one wishes to kill cancer cells by want of energy. He tried to induce this condition by keeping rats bearing implanted tumours for 40 hours in an atmosphere containing the minimum amount of oxygen compatible with the life of the animals (5 volumes per cent. oxygen). As the result of this treatment he found that the bulk of the cells of the implanted tumour were killed. The cells at the periphery of the tumour, however, remained alive and continued the growth of the tumour, so that the treatment did not lead to a "cure." Fischer and his collaborators [2] used the opposite method, keeping tumour-bearing rats under increased oxygen pressure. They based this procedure on the observation that in tissue culture cancer cells can be killed by increasing the oxygen tension. By keeping mice with tumours in practically pure oxygen for 18–24 hours under 1·6–2 atmospheres of pressure they succeeded in bringing about a disappearance of the tumour in a considerable number of animals, but only if the treatment was applied during the first week after transplantation. Pneumonia frequently occurred in the animals thus treated, and the regression was often accompanied by infections of the tumours, with the formation of pus and ulceration. It is well known that such high pressures of oxygen as those used by Fischer are dangerous to man and to most animals, owing to the onset of pneumonia, as demonstrated by Lorrain Smith [3] and recently again by Binger, Faulkner, and Moore.[4] The regression of the tumours is probably related to infections supervening upon the toxic effects of oxygen on the tumour-bearing animal. The suggestion has also been made, although not by Warburg himself, that the genesis of cancer may be the direct result of an inadequate supply of oxygen, which would induce potentially-malignant cells to switch over from respiration to fermentation. On that view chronic irritation leads to cancer because it produces a local oxygen deficiency. Auler [5] has recently applied Fischer's results therapeutically to cancer patients by exposing them in pneumatic chambers to increased oxygen tension, and believes that he has obtained a temporary improvement. In order that our results might be more directly applied to man, we have used oxygen pressures within the limits of safety—that is, increased up to about 60 per cent. of an atmosphere. We have also tested very low oxygen pressures in the inspired air, the lowest average being 9·6 per cent. of an atmosphere. Normally the oxygen pressure breathed is about 21 per cent. of an atmosphere, so that in our high oxygen pressure experiments we have increased the pressure by about 200 per cent. above normal and in the low oxygen pressure experiments we have decreased the pressure to a level less than 50 per cent. of the normal. This is equivalent to an altitude of about 18,000 ft. By keeping our experiments within these limits we had the advantage of being able to submit the tumour-bearing animals to these different conditions for long periods of time—2–3 weeks.

Technique.

The animals were exposed to the altered oxygen pressure by enclosing them in air-tight chambers which have been fully described elsewhere [6]; these chambers were built on the principle recommended by Edie.[7] The animals were placed in small groups in the usual boxes or cages with more than sufficient food and water for 3–4 days, so that the chambers had to be opened only every third or fourth day for renewal of food. This process was carried out rapidly, so that the total period of breathing normal air at each opening of the chambers was kept below 30 minutes; during the rest of the period of the experiment the animals breathed the oxygen at the desired pressure. This pressure was reached by passing through the chambers, as soon as they were closed, the proper mixtures of oxygen and nitrogen to give the necessary final oxygen percentages. The oxygen percentage remained remarkably constant without much further attention, as was shown by daily analysis of the air in the chamber by means of Haldane's apparatus. As the animals used oxygen, carbon dioxide was produced, and this was absorbed by soda-lime placed in porcelain trays on shelves within the chambers. As the carbon dioxide was absorbed the pressure in the chamber fell slightly, and fresh oxygen bubbled in automatically from a gasometer through a water-valve. In this way, under ordinary circumstances, the whole apparatus could be left to itself for at least 12 hours without any great change occurring in the oxygen pressure in the chamber. The barometric pressure in the chamber was about the same as that of the outside air—that is, near sea-level pressure—whilst the temperature was kept nearly constant (about 15° C.) by attention to the heating of the rooms in which the chambers were placed. The raising or lowering of the oxygen pressure was performed gradually, and extended over the first four days in each experiment.

The animals (mice and rats) were fed on a liberal supply of a grain mixture of oats, wheat, and barley with greenstuff and a soft mixture of brown bread and "Quaker" oats, moistened with a little milk. An ample supply of water was placed in the usual receptacles suspended from the top of the cage or box. The cages were kept clean and dry by a thick layer of sawdust, whilst cotton-wool was provided for a nest.

The animals were inoculated with rapidly growing tumours, the rats with Jensen's rat sarcoma and the mice with carcinoma No. 63. Five series of experiments were carried out, each lasting about 14 days. The experiments were controlled by keeping batches of rats and mice inoculated with the same strain of tumours under normal oxygen pressure; in many cases the tumours were weighed and charted in the usual way. In addition controls of uninoculated rats and mice on the same diet and breathing air with normal oxygen pressure were kept.

Effect of Oxygen Pressure upon the Growth of Cancer.

In previous experiments by one of us (J. A. C.) normal animals of various kinds were exposed to air containing abnormally high and abnormally low pressures of oxygen for several weeks. The after-history of the survivors, up to 18 months, has given no indication that either high or low oxygen pressure favoured the origin of cancer; one of the older mice eventually developed mammary cancer, but this occurs in mice which have never been exposed to altered oxygen pressure. In the present research we have exposed inoculated rats and mice to high oxygen pressure, and other similarly inoculated rats and mice to low oxygen pressure. The results for the high oxygen pressure (about 57 per cent. of an atmosphere) are given in Table I., whilst the results for the low oxygen pressure (about 11 per cent. of an atmosphere) are shown in Table II.

TABLE I.—*High Oxygen Pressure Experiments; Effects upon Inoculated Rats and Mice.*

Experiment No.	Duration, days.	Animals. Used.	Animals. Died.	Tumour inoc.	Av. O_2 inspired per cent. atmosp.	Av. weight of surviving animals (g.). Before experiment.	After experiment.	Per cent. difference. Including tumour.	Excluding tumour.	Av. weight of tumour (g.).
1	14	6 r.	0 r.	J.R.S.	55·3	40·3	49·8	+23·5	+ 3·2	8·2
2	13	4 r.	0 r.	J.R.S.	59·2	37·6	49·9	+32·7	+ 8·5	9·1
3	14	12 m.	5 m.	No. 63	55·3	19·3	23·6	+22·3	+17·1	1·0
4	13	12 m.	5 m.	No. 63	59·2	13·5	18·3	+35·5	+24·4	1·5
				Av. ..	57·2	—	—	+28·5	+13·4	—

TABLE II.—*Low Oxygen Pressure Experiments.*

1	14	6 r.	4 r.	J.R.S.	10·4	50·5	43·5	−13·8	−25·1	5·7
2	13	4 r.	2 r.	J.R.S.	12·1	51·0	41·7	−18·2	−26·9	4·5
3	14	12 m.	8 m.	No. 63	10·4	18·9	16·7	−11·6	−14·3	0·5
4	13	12 m.	6 m.	No. 63	12·1	15·7	15·1	− 3·8	− 9·5	0·9
				Av. ..	11·2	—	—	−11·9	−18·9	—

r. = rats; m. = mice.

As judged by weights and charts the tumours in the high oxygen experiment grew at about the same rate as the controls for both rats and mice, so that high oxygen pressure does not greatly affect the growth of the very rapidly growing tumours as compared with the controls. On the other hand, tumours of the same strain in the low oxygen pressure experiments (Table II.) showed definitely slower growth than either the tumours under high oxygen pressure (Table I.) or the tumours of the controls. It will be seen that under high oxygen pressure the rat tumours weighed on the average about 8–9 g. and the mouse tumours 1–1·5 g., whilst under low oxygen pressure the tumours in the rats weighed only about 5 g. and those in the mice 0·5–0·9 g. It is of special interest to note that the tumours under low oxygen pressure were much more extensively necrotic, and most of them showed areas of congestion and hæmorrhage. The effect of low oxygen pressure upon the growth of the Jensen rat sarcoma was confirmed by Experiment No. 5 (Table III. and Chart 1) in which glucose was added to the drinking water in one batch of normal and one batch of tumour-bearing rats.

In this experiment the average weight of tumours for two batches of six rats kept under low oxygen pressure was 10·7 and 5·7 g. respectively, whilst the average weight of the control tumours under normal oxygen pressure was 28 g. The inhibitory effect of low oxygen pressure upon the cancer cells is accompanied by a general effect of low oxygen pressure upon the tissues of the body. This is seen clearly by studying

TABLE III. (Expt. No. 5).—*Effect of Glucose on Normal and on J.R.S. Inoculated Rats Exposed to Low Oxygen Pressure (av. = 11·5 per cent. atmos.) for 15 Days.*

No. of rats.	Deaths.	Fluid. Supplied.	Fluid. Amount consumed c.cm. per diem per animal.	Av. weight of surviving animals (g.). Before experiment.	After experiment.	Per cent. difference. Including tumour.	Per cent. difference. Excluding tumour.	Average weight of tumour (g.).
6 norm.	3	H_2O	0·72	40·4	36·5	—	− 9·6	—
6 ,,	0	5% gl.	4·82	40·7	32·3	—	−20·6	—
6 inoc.	0	H_2O	0·72	41·9	46·3	+10·9	−14·8	10·7
6 inoc.	1	5% gl.	3·85	40·2	39·7	− 1·2	−15·4	5·7
						Av. ..	−15·1	

gl. = glucose.

CHART 1.

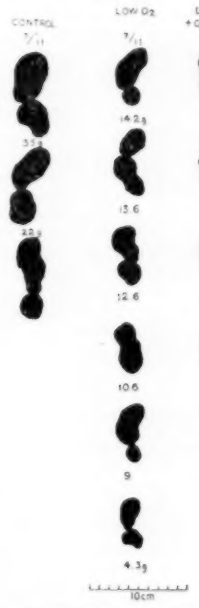

CHART 2.

CHART 1 (Expt. 5).—Growth of the Jensen rat sarcoma from Oct. 21st, 1927, to Nov. 7th, 1927, under normal conditions ("control"), under reduced oxygen pressure with and without the addition of glucose to the drinking water. The figures underneath the charted tumours give the weight of each tumour in grammes. The charts illustrate the marked retardation of growth during the exposure to lower oxygen pressure.

CHART 2 (Expt. 3).—Growth of the mouse carcinoma 63 under high and low oxygen pressure from Sept. 20th, 1927, to Oct. 4th, 1927. From Oct. 4th to 18th the animals were kept under normal atmospheric conditions. The chart illustrates the marked retardation of growth under low oxygen pressure as compared with the usual rapid growth during high oxygen pressure. It also shows the resumption of normal rapid growth when the low oxygen pressure was replaced by normal oxygen pressure.

in detail the effects upon weights of the normal body tissues of the animals.

Effect of Oxygen Pressure upon Body-weight in General.

In previous experiments [1] it was shown that normal rats and mice tolerated high oxygen pressure up to 60 per cent. of an atmosphere, and did not appear to be greatly affected as regards body-weight and metabolism. On the other hand, normal rats and mice were adversely affected by prolonged exposure to low oxygen pressure, losing at least 20 per cent. of weight in a few weeks, partly owing to loss of appetite. The low oxygen pressure appeared to affect the heart in particular, and the organs of those animals that died during the experiment showed changes due to marked congestion caused by heart failure. The animals which survived these experiments recovered their good health when they were placed under normal conditions again.

This adverse action of low oxygen pressure was seen in the present research. Under low oxygen pressure (Table II.) the animals lost 18·9 per cent. of their body-weight, whilst in Table III. the loss was about 15 per cent.; these figures are exclusive of the tumour weights. Under high oxygen pressure the animals gained (Table I.) about 13·4 per cent. of body-weight, so that in these experiments the total loss in body-weight due to low oxygen pressure was about 30 per cent. when compared with the high oxygen pressure figures. It must be remembered that the animals were young growing animals, and the increase in weight under high oxygen pressure was simply due to this and not to the high oxygen pressure. The controls under normal oxygen pressure also showed on an average well over 10 per cent. increase of body-weight in two weeks. The animals under low oxygen pressure did not develop any infections.

An attempt was made to counteract the harmful effect of low oxygen pressure in the organism by increasing the consumption of glucose. This was done by dissolving glucose (5 per cent.) in the drinking water. Although this led to a considerable increase in the consumption of fluid by the animals, no evidence was obtained that they were benefited.

The effect on the growth of the tumour as well as that on the tumour-bearing animal lasts only so long as the animals are exposed to the low oxygen tension. In one experiment some of the tumour-bearing animals were allowed to remain alive for three weeks under normal conditions, after they had been subjected to low oxygen tension for two weeks with the usual effect on tumour growth and body-weight. The tumour resumed its normal rapid growth, the animals improving temporarily (Chart 2). In so far as exposure to low oxygen tension produces an extensive necrosis of the tumour, the effect is permanent, but in almost all general conditions studied up to now, as, for instance, dietetic deficiencies, the malignant tissue has exhibited a remarkable independence of the general state of nutrition of the host. Thus, as is well known, a malignant new growth will continue to grow in an organism which is itself dying of inanition. Exposure to low oxygen tensions, however, is a general condition which damages malignant tissue more severely than normal tissue. It has, moreover, this advantage, that since its action extends over the whole organism it will produce its effect on malignant tissue in its metastatic deposits. Unfortunately, it does not damage it so completely as to be of therapeutic value by itself, for since a fraction of the malignant cells survive they resume their growth when normal conditions are re-established.

Summary.

1. Rapidly growing implanted tumours in rats and mice show a greatly diminished rate of growth during prolonged exposure (two weeks) of the animals to low oxygen pressures. This is accompanied by extensive necrosis of the tumours. This confirms the observations of Warburg and his collaborators. Exposure to high pressure of oxygen (60 per cent. of an atmosphere) produces no effect on the tumours.

2. The decrease in rate of growth of the tumour which occurs under low oxygen pressure is accompanied by a decrease in growth of normal body tissues.

3. So far as the experiments go there is no evidence that alterations—within the limits of safety—of oxygen pressure in the inspired air are by themselves of therapeutic value.

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SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The Glasgow V.D. Bill.

LAST week the Glasgow Corporation followed the example of the Edinburgh Corporation in adopting by a large majority the draft of a Bill to make further provision for the prevention, notification, and treatment of venereal disease. The Bill represents the end-result of seven years' hard work during which conferences have been held with the sanitary authorities of all the Tyneside burghs and the neighbouring counties. Dr. James Dunlop, Convener of the Subcommittee on the Treatment of Venereal Disease, informed the Corporation that there were 100,000 persons infected with venereal disease within the limits of the city, of whom 75 per cent. were innocent sufferers. Whereas, he said, in contradistinction to tuberculosis, cure could be guaranteed to the persistent patient, it was a fact that one-half of the male patients discontinued attendance before they were free from the risk of conveying infection. The Bill places upon any person who has contracted venereal disease the responsibility for continuing treatment so long as the disease is deemed to be in an infective condition. Should a patient discontinue treatment, the medical practitioner becomes responsible for notifying the case to the medical officer of health, who then requests the affected person to resume treatment. Should he fail to comply he becomes liable to prosecution or removal to hospital on a magistrate's order. The medical officer of health may also require any person who he has reason to believe is suffering from venereal disease, and not under treatment for it, to submit to treatment or produce medical evidence that he she is not so suffering. In dealing with newly born children suffering from ophthalmia or older children with congenital syphilis, the practitioner must inform the parents, should he have reason to believe that either of them is suffering from venereal disease, but may withhold disclosure of the fact if he is satisfied that the parents' state of health justifies his abstention. The Bill was opposed at the Council meeting by Bailie Miss Snodgrass, who stated that the voluntary principle was having good effect, and that to depart from it and introduce an element of compulsion would prevent people from submitting voluntarily to treatment, and thus lead to concealment of disease. But the amendment which she proposed to refer the draft Bill back to the Committee was supported by only two other members of the Council. Dr. Robert Forgan stated in the course of the discussion that 115 out of 123 doctors in the West of Scotland whom he had approached were in favour of further powers being granted. Progress with the Bill will now depend on the fate of the Edinburgh Bill.

THE ROYAL COLLEGE OF SURGEONS AND CANADA.

THE QUESTION OF AN IMPERIAL DIPLOMA.

SOME two years ago the Canadian Medical Association, which is anxious to improve the standard of medical education in the Dominion, invited the Royal College of Surgeons of England to consider whether means could not be found to make it easier for Canadian graduates to attain the Fellowship of the College. It was pointed out that expenditure of time and money on a journey to London was often prohibitive, and it was suggested that examinations should be held in Canada. Last May the Council of the College decided that "it is desirable to send examiners to the Dominions to conduct a Primary Examination for the Fellowship, of the same standard as the examination in this country . . . provided that satisfactory arrangements can be made." After negotiation with the Canadian Medical Association a scheme has been approved whose provisions are as follows:—

1. The Canadian Medical Association to be appointed the authority in Canada representing the Royal College of Surgeons in connexion with the proposed examination, and to be responsible for the arrangements to be made in Canada to enable the Examiners of the College to conduct the examination in that country.

2. An examination to be held by the College at Toronto at the end of July or in August, 1929, provided that it is notified to the Secretary of the College not later than May 1st, 1929, that there are such a number of eligible candidates desirous of being examined as may be agreed by the College and the Canadian Medical Association as sufficient to warrant the holding of an examination in Canada.

3. Two Examiners in anatomy and two in physiology, who shall be present or past members of the Board of Examiners in Anatomy and Physiology for the Fellowship, to be sent by the College from England.

4. A professor of anatomy and a professor of physiology, or such other persons as may be nominated, to be appointed by the College from names submitted by the Canadian Medical Association to act as assessors to the Examiners.

5. The examination, written and viva voce, of each candidate in each subject to be conducted by two English Examiners and one Canadian assessor.

6. The Canadian Medical Association to be invited to appoint suitable persons to visit and inspect the examination.

7. The questions for the written paper in Canada to be set by the Board of Examiners in Anatomy and Physiology for the Fellowship at the same time as those for the written paper for the June examinations in England, and to be taken to Canada by the Examiners sent from England.

8. The written paper examination to be held on the arrival of the Examiners in Canada, and the viva voce examination as soon after as convenient.

9. The result of the examination to be determined and announced by the Examiners in Canada on the completion of the examination.

10. Notice of the date and place of the examination to be given in the *Journal of the Canadian Medical Association* and in such other way as may be thought desirable.

General satisfaction will be felt at the forging of this link between surgical practice in England and the Dominion of Canada. If extended to other parts of the British Empire, the arrangements would help to establish the Fellowship as an Imperial diploma for post-graduates, and would raise the general standard of practice. The alternative is for each of the States of the Empire to set up its own standards and institutions without reference to the rest—a tendency illustrated by the recent formation of the Surgeons of the College of Australasia. The success of this alternative depends on the wisdom with which new traditions are established and on the enthusiasm with which they are inspired. National institutions have the merit of commanding national interest, and competition between them is undoubtedly healthy; on the other hand, a common organisation does something to promote a valuable community of thought among workers in the same field.

Public Health Services.

THE N.H.I. AMENDING BILL.

DISCUSSION ON SECOND READING.

(FROM AN OCCASIONAL CORRESPONDENT.)

YOU were well advised in giving so large a space in your last issue to the debate on the National Health Insurance Bill, for the second reading of any Bill in the House of Commons is generally used as the means of informing the public what are the principles involved in the Bill. And the public are in dire need of enlightenment on the further development of an insurance scheme which has already made so profound a change in medical practice and is likely as time goes on to have still greater an effect in modifying the work of the general practitioner. The scope of the Bill is very limited, but it must not on this account be regarded as unimportant. The primary object of all legislation which alters the administrative machinery of the Insurance Act should be the promotion of the health of the insured person. Provision of adequate treatment in illness, speedy restoration to normal working capacity, and prevention of sickness amongst the workers are all objects well within the scope of the original Act, and there seems to be a serious danger of these objects being overlooked in the consideration of the interests of the various authorities administering the scheme. The Bill, in fact, is disappointing as a step in the development of the insurance scheme, though certain clauses are to be welcomed. It is true that the arrears scheme does mitigate the hardship of the unemployed insured person to a satisfactory degree and materially helps the approved societies in the administration of benefit. The improvement in the condition of the Deposit Contributors' Fund, whereby the benefits obtainable by "bad lives" will approximate more closely to those of the ordinary insured person, is all to the good. An important move is made in Clause 14 (3) which empowers the Minister to make regulations for the administration of additional benefits, and provides against such an inrush of new members to any society offering some attractive scheme as might prejudicially affect its financial position.

The administration and regulation of any additional benefits that may be offered by a society is likely to be a thorny point. In this connexion Clause 14 is strongly opposed by the approved societies. A letter circulated to Members of Parliament by the Association of Approved Societies says "the Bill is also designed to interfere with the self-government of societies by their members and to substitute therefor the bureaucratic fiat of the Department." Neither does this clause find favour with the insurance committees. If any of these additional benefits become statutory they should be administered by insurance committees like general medical benefit, and it is feared that Clause 14 in conjunction with the repeal of Section 75 (5) of the 1924 Act will prejudice the rights of insurance committees in the future. Section 75 (5) of the 1924 Act provides that: "Additional benefits shall be administered by the society or branch of which the persons entitled to benefits are members, except where the benefits are in the nature of medical benefit, they shall be administered by and through the insurance committees." The third schedule of the present Amending Bill repeals the section just quoted "as the Regulations to be made will make provision for the manner in which the several additional benefits are to be administered" (see p. 13 of the explanatory memorandum). It is possible to conjecture from all this how varied and mutually opposed are the claims of the various bodies who take part in the administration of the Act.

The political interests involved probably explain much that has been left out of the Bill. After the passing of the Economy Act in 1926 it was natural to attribute the shortcomings of any legislation or action

of the Ministry to the lack of funds. But in the course of the debate it was definitely stated by the Parliamentary Secretary on behalf of the Ministry that "but for the opposition of the approved societies of the country it would be perfectly possible to put into operation the scheme of the specialist services without bringing any additional funds into the national insurance system at all." The Royal Commission stated that if the approved societies could agree to pool their funds the scheme could be put into immediate operation. It is clear, therefore, that the Government have had considerable difficulty with the vested interests, and this is probably the real explanation of the fact that two of the most important recommendations of the Royal Commission are left out of the Bill—namely, the pooling of surpluses and the abolition of insurance committees. The Economy Act may have had a direct influence, for it was pointed out that the amount available for investment by the societies fell from £8,000,000 in 1925 to £200,000 in 1927, and it was on the interest from these investments that the additional benefits depended. The extension of maternity benefit to cover medical and midwifery services, the extension of the scope of medical benefits to the dependents, and the provision of specialist services and laboratory facilities, all highly desirable, are apparently blocked by the failure of the societies to agree to a unified administration with the pooling of funds. It is interesting that in certain areas—for example, in South Wales—the much criticised medical aid institutions (which could be approved under the Insurance Act) are providing a more extended service; this includes expert advice, special treatment, laboratory facilities, dental and ophthalmic treatment, and professional nursing.

It is time that a long view should be taken of the economics of national health insurance. Any development which increases the facilities for improved diagnosis and prompt and adequate treatment would be an economical move. The experimental dental clinic which is to be set up in certain areas may be an important indication as to future activities.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some of the 1927 statistics of the County Borough of Reading and Borough of Poole:—

Name of district and estimated mid-year population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Diarrhœa, &c., under 2 years.	Maternal mortality from childbirth.
Reading .. .. (94,660)	15·3	12·3*	0·99	1·27	2·1	1·6	42/25	2·7	2·1
Poole .. .. (51,030)	17·5	12·3*	0·71	1·45	2·4	1·4	58/33	4·5	0·0

* The standardised death-rates of 10·7 for Reading and of 10·3 for Poole may be compared with the rate of 12·3 for England and Wales.

Reading.

Dr. H. J. Milligan reports that the infant mortality is lower than it has ever been before. The improvements to the maternity home have been completed and have greatly added to its efficiency. The extensions to the isolation hospital have also come into use. A joint committee representing the county borough council, the board of guardians, and the Royal Berkshire Hospital have gone into the question of the hospital accommodation of the borough. The principal deficiency found was a lack of beds for acute surgical cases. The Royal Berkshire Hospital propose to establish a branch hospital with immediate accommodation for 60, and capable of expansion to provide for 240. This branch hospital will provide for diseases of bones and joints, which at present occupy beds for long periods, and also open-air treatment for post-operation cases. The joint committee agreed that the present coöperation between the various hospital authorities was quite satisfactory.

Paratyphoid fever was unusually prevalent from May to December. There were 44 notifications and no deaths. No special reason could be assigned for the prevalence except the passing on of infection by mild and "missed" cases. There were also six notifications of true enteric fever of the severe type with two deaths. Towards the latter end of the year a very grave form of diphtheria appeared. There were 74 notifications and 17 deaths, giving a case-fatality of 23 per cent. Between October, 1927, and February, 1928, 64 diphtheria patients were admitted to the isolation hospital, of whom 14 died. Of those who recovered, 16 suffered a long illness with complications such as marked toxæmia and paralysis. Of the patients who died, the disease had usually reached the fourth or fifth day before admission to hospital, too late for antitoxin to be of any avail. The Borough of Reading Medical Society, Ltd., and the Reading Public Dental Service, Ltd., provide medical and dental treatment for the dependants of insured persons and others whose incomes do not exceed £250 per annum. At the Tuberculosis Dispensary, out of 73 contacts examined, one was found to be suffering from non-pulmonary tuberculosis, 19 showed suspicious symptoms, or signs needing continued observation, and 53 showed no clinical signs of infection. At the V.D. Clinic the new cases of syphilis continue to decline. In 1927 there was a sudden drop in the congenital cases, which Dr. Milligan thinks is due to the cases not being sent to the clinic as freely as before, rather than to an actual decline in the cases. In the 1927 returns there is a new heading for 21 patients who left off treatment before being cured, and returned after six months or more for further treatment.

A table shows that since 1905 the neonatal mortality has declined from about 35 to 25, the infant mortality from bronchitis and pneumonia from 17 to the neighbourhood of eight, and that from gastro-intestinal diseases from 17 to the neighbourhood of three. Dr. Milligan reports that antenatal supervision is being carried out efficiently by the younger and more highly trained midwives, and that those midwives who are not capable of doing this work themselves, encourage their patients to attend the antenatal clinic. The antenatal clinic was attended by 250 new patients, who made 999 attendances. A record is now made of the blood pressure of all patients attending this clinic.

Of 55 samples of milk examined bacterially four were found to contain living tubercle bacilli. In three of the cases the infected animal was traced and destroyed. The housing committee has had under consideration the question of slum property. During the last seven years 62 slum houses, representing one-fifth of those recommended for demolition, have been demolished. Owing to the house shortage it is not possible to deal with the others, or to find a remedy for overcrowding in most cases. The municipal houses completed numbered 332 and subsidy houses 148, but the level of the years of moderate building activity before the war has not yet been attained. The school report especially emphasises the difficulties of the dental scheme owing to a quite inadequate staff.

Poole.

Dr. R. J. Maule Horne reports that a considerable proportion of the 499 new houses have been erected in semi-rural districts, which were unsewered, and that in many cases the road access to these houses is precarious. As a result the number of cesspools, which the health department has to empty, has increased from 490 in 1906 to 610 in 1927. An additional 100 cesspools expected in 1928 will increase the difficulties of the cleansing department. A year ago the housing shortage was estimated at 518. At

the end of 1927 it was estimated at 309. Dr. Horne would like to see a model lodging-house erected, especially for the accommodation of visiting seamen.

Energetic efforts are made to cope with rats, both in the borough and port, but the refuse tips add to the difficulty of dealing with them. At the present time tipping is used for reclaiming land, but Dr. Horne hopes that the reclamation scheme will soon be complete and a more sanitary method of refuse disposal adopted. Spraying with paraffin is adopted for the fresh-water lakes and ponds in order to keep down the mosquitoes, and attention is given to keeping the water courses clear and avoiding sluggish by-pools. Dr. Horne presses for a public abattoir. A considerable proportion of the butcher meat consumed in Bournemouth is killed and dressed in the Poole slaughter-houses, which number 12, and are scattered over an area of some 12 square miles, thus rendering inspection very difficult. Late in the year the Southern Sea Fisheries' district committee issued licences for the dredging and relaying of 50,000 oysters. There are now some 200,000 persons living close to the shores of the harbour and in consequence the oysters have to be relaid at Shipstal, in the Arne reach of the harbour. The close season extends from May 15th to Sept. 30th.

A table for the years 1907 to 1927 shows that there has been during that period an even greater reduction in the child-mortality from one to five years than in the infant mortality-rate. Thus, in the earlier years of that period the one to five years child deaths were over 40, whilst during the last four years they have been 21, 20, 11, and 9 respectively. The infant deaths, on the other hand, during the earlier years were in the neighbourhood of 80, and during the last five years they have varied from 46 to 60.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 7TH, 1928.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 318 (last week, 322); scarlet fever, 1622; diphtheria, 1080; enteric fever, 32; pneumonia, 1345; puerperal fever, 52; puerperal pyrexia, 103; cerebro-spinal fever, 6; acute poliomyelitis, 7; acute polio-encephalitis, 1; encephalitis lethargica, 29; continued fever, 2; dysentery, 23; ophthalmia neonatorum, 99. No case of cholera, plague, or typhus fever was notified during the week.

The cases of small-pox were notified from the following 20 counties: London, 1; Bedford, 7; Chester, 2; Derby, 6; Durham, 92; Gloucester, 2; Kent, 1; Lancaster, 35; Lincoln, Parts of Lindsey, 1; Middlesex, 1; Norfolk, 1; Northumberland, 13; Nottingham, 2; Stafford, 3; Surrey, 1; Warwick, 7; Yorks, North Riding, 3, West Riding, 69; Glamorgan, 38; Monmouth, 33.

The number of patients in the Infectious Hospitals of the Metropolitan Asylums Board on April 10th–11th was as follows: Small-pox, 7 under treatment, 4 under observation; scarlet fever, 1601; diphtheria, 2368; enteric fever, 31; measles, 1542; whooping-cough, 136; puerperal fever, 16 (plus 15 babies); encephalitis lethargica, 66; other diseases, 31. At St. Margaret's Hospital there were 12 cases of marasmus, and 14 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 3 (2) from enteric fever, 144 (82) from measles, 5 (1) from scarlet fever, 41 (6) from whooping-cough, 44 (13) from diphtheria, 34 (8) from diarrhœa and enteritis under two years, and 108 (6) from influenza. The figures in parentheses are those for London itself.

Of the 62 fatal cases of measles outside London, 7 were reported from Willesden, 5 from Sheffield, 4 each from West Ham and Salford, and 3 each from Brentford and Chiswick, Plymouth, and Manchester, while the figures in Edinburgh, Glasgow, and Dublin for the same week were 5, 9, and 9. Of the 35 fatal cases of whooping-cough, 6 each were reported from Birmingham and Liverpool, and 5 from Newport (Mon.).

The number of stillbirths registered during the week was 258 in the great towns, including 46 in London.

Correspondence.

"Audi alteram partem."

HAS THE CAMPAIGN AGAINST VENEREAL DISEASES BEEN A FAILURE?

To the Editor of THE LANCET.

SIR,—The statement in your last issue (page 773) that medical authorities in Edinburgh, after an exhaustive trial, are convinced that the "voluntary system cannot control or eradicate venereal disease in a reasonable time . . . and they are of the opinion that it must be reinforced by compulsion," has raised, in an acute form, the fear that has been worrying us in England for some time, that all is not well with the scheme promulgated by the Ministry of Health in 1917. Venereal disease is not diminishing in England. During the last three years, for which figures are available (1924–26) syphilis has remained stationary around 22,000 per annum, and gonorrhœa increased from 30,000 to 35,000. If this increase meant that more cases attended the clinics, because they knew of the facilities for treatment, it would be a matter for congratulation. But apparently, in Edinburgh, they do not think so, and in this I am inclined to agree.[1] Instead, they stress the point that of the annual 3000 who attend their clinics, about 33 per cent. default before cure; and to this they attribute the persistency with which the numbers keep up. It is to deal with these defaulters, and the other cases which never come to any qualified source for treatment, that they wish to obtain compulsory powers.

It may be interesting, then, to compare the figures in Edinburgh with those in London for the same period, and see what we can deduce from them. In 1921 the total attendances in London were 19,368. In 1926 they had dropped by 8 per cent. to 17,724.[2] Analysing these figures one finds that the diminution is entirely due to the fact that syphilis dropped from 8188 to 5738, whereas gonorrhœa rose from 10,709 to 11,683. Here, I think, we can put our finger on the weakness inherent in the scheme originated by the Ministry of Health. That weakness is that the conditions governing the successful treatment of syphilis and gonorrhœa are radically different.

Syphilis is a disease that readily lends itself to out-patient treatment. With the powerful arsenicals now at our disposal we are able, temporarily, to render patients non-contagious from the public health standpoint with extreme ease and rapidity. This is what the Ministry aimed at; for it was not out, primarily, to cure syphilis, but to treat it in the "early and communicable" stage—in other words, to render it non-contagious. In practice, of course, it is not desirable to stop at this stage. The clinics have not done so, nor have the Ministry objected in any way, though this prolongation of treatment is not inherent in the scheme, which is essentially drawn up from the view-point of the public and not the individual. Luckily, even with this extended view, a weekly or bi-weekly attendance at a venereal clinic is amply sufficient for the vast majority of cases of syphilis.

In the cure of gonorrhœa, however, we are not in anything like as happy a position. Here out-patient treatment is but a poor substitute for in-patient care, even in males, as everyone with knowledge of the work in the Services will agree. Treatment, moreover, is much more complicated in gonorrhœa than in syphilis; there is a much greater loss of working time owing to the frequent necessity of attendance daily for irrigations, &c.; and, worst of all, the period of infectivity has not been diminished appreciably in the last 20 years, simply because we have nothing

[1] Edinburgh Corporation Bill, 1928. Venereal Diseases. Statement for the Corporation. Beveridge and Co., 23, Abingdon-street, S.W. 1.

[2] L.C.C. Annual Reports, 1926, Vol. III.

in our armamentarium against gonorrhœa comparable to arsenic in syphilis. Defaulting, therefore, is much more common, and gleet is still the greatest bugbear we have to contend with. When we come to consider the treatment of gonorrhœa in the female, we find that we are still worse off. Gonorrhœa in the female is a most intractable disease. It has been asserted that it is incurable. This is nonsense; but the fact remains that, as far as out-patient treatment is concerned, cure is exceedingly difficult. From the public health standpoint this is a most unfortunate circumstance, because one woman can infect 100 males in less than a year, and, with the best out-patient treatment, infectivity may last in women for years. Women require, even more than men, physical as well as sexual rest to permit of cure.

The Ministry of Health has devoted its energies largely to providing facilities for out-patient treatment. This was the obvious first step. If defaulting were not so frequent, it is probable that syphilis would now be very much diminished by this means. But with gonorrhœa, especially in the female, I am convinced that only a great increase in the provision of in-patient treatment will produce any appreciable improvement. Gonorrhœa in women appears to be steadily increasing in London—2136 applied for treatment in 1921, 2858 in 1926—and yet nothing practically has been done to provide them with the necessary in-patient accommodation. There were 150 beds at the London Lock Hospital in 1914. This number has not been increased; and no other hospital in London has made any adequate attempt to supply the deficiency. Certain hostels, it is true, have been provided where patients under out-patient treatment could sleep. Apart from the fact that rest and proper supervision cannot thus be provided, the numbers using these hostels have been too few to affect the main contention. I consider that at least 500 beds are required adequately to tackle the problem of gonorrhœa in women in London. Until this has been done it is difficult to see how one can possibly hope to stem the steady increase of gonorrhœa in both sexes that we are up against at the present moment.

It is to be hoped that the statement that the Government will oppose the second reading of the Corporation of Edinburgh's Bill is inaccurate. The Bill ought to have a fair chance. It is backed by the weight of medical opinion all over Scotland. Edinburgh is a favourable centre on which to base such an experiment. Obviously the scheme as at present administered in England is not the success we have the right, with all our hard work, to expect. We should learn much from the success or failure of the Edinburgh scheme. It is to be hoped that the Ministry of Health will not persist in its non possumus attitude, but will give the Bill the chance that it deserves.—I am, Sir, yours faithfully,

J. JOHNSTON ABRAHAM.

Harley-street, W., April 14th, 1928.

GASTRO-DUODENAL ULCERATION.

To the Editor of THE LANCET.

SIR,—It would be a calamity if the profession at large was lulled into a state of false security by such statements as "alkalosis is a bogy which need not be feared," especially when uttered in high places, and my excuse for reopening the correspondence on this subject is to emphasise the dangers alluded to by Dr. Hurst in his letters of March 3rd and 17th by recording in some detail the following experience which has occurred, aptly enough, in a patient undergoing treatment for duodenal ulcer on the lines laid down by Prof. MacLean and his associates.

Mrs. X, a woman of 48, had her right kidney removed for hydronephrosis in 1914. Two years later symptoms suggestive of duodenal ulcer made their appearance and continued off and on till 1924, when the diagnosis was confirmed by X ray examination, and she underwent a course of medical treatment at home under the direction of my colleague Dr. A. P. Thomson, who tells me that he made a note in April of the same year, "Cannot take alkalis well ? Kidney." The symptoms were not severe, and the urine was free from albumin. She remained well for some months, being able to take alocol and a nightly dose of milk and magnesia, but she then broke down again, attacks of typical ulcer distress alternating with periods of relative calm until in January of this year she heard of the results claimed by Prof. MacLean and his associates. Under the impression that here, in the outer darkness, we were unfamiliar with this recent development in ulcer therapeutics, she consulted a well-known practising physician in London from whom details of the treatment were obtained, an opinion being expressed at the consultation that her previous nephrectomy was not a contraindication. The complete régime was sent to her private doctor, under whose care she entered a nursing home on March 13th. I saw her for the first time on Friday evening, March 16th, the treatment having then been in progress four days. Toxic symptoms had appeared on March 14th, when she complained of headache which increased in severity during the next 24 hours, and on the following evening she began to vomit her feeds. By March 16th she appeared desperately ill; there was complete anorexia, constant nausea, and an inability to retain any food, the headache remaining severe. At this time the urine contained a moderate cloud of albumin, and granular casts were fairly numerous in the centrifuged deposit. The blood pressure was 185/95. The vomit was acid, the readings being 26 for the free HCl, and 42 for the total acidity. The removal of all alkalis and the substitution of rectal salines containing glucose and calcium chloride for mouth feeding brought about a rapid improvement in her condition, and within 24 hours she was free from urgent symptoms. The blood-urea examined after 24 hours' starvation was 93·6 mg. per 100 c.cm; a week later 69·1, and at the time of writing, April 11th, 35. The urine became free from albumin within 48 hours, and casts are no longer present. The urea-concentration test, carried out by Calvert's method on April 6th, gave urea readings (*a*) 3·1 per cent. (*b*) 0·774 per cent. The blood pressure also fell rapidly, and has been 135/85 for the past fortnight.

I have recorded this case in detail because it illustrates the possibility of occurrence of toxic symptoms from alkalis in a patient in whom the renal function is normal by the usual tests at our disposal, and because I cannot agree that no special supervision or knowledge is necessary in carrying out this particular line of treatment. Every practitioner should be aware of the manifestations which may occur as a result of the administration of large doses of alkali, and while symptoms of the severity of those recorded are admittedly rare, minor disturbances are, I submit, not uncommon. I have used Dr. Hurst's modification of Sippy's régime for the past seven years, with excellent results both in hospital and private practice, but not infrequently have had patients especially in hospital who complained of nausea, slight headache, and even occasional vomiting, which were relieved by reducing the dosage of alkali or by substituting the insoluble neutral tribasic phosphates of calcium and magnesium.

I am, Sir, yours faithfully,

Birmingham, April 11th, 1928. T. L. HARDY.

THE PREVENTION OF PERITONEAL ADHESIONS.

To the Editor of THE LANCET.

SIR,—In a critical analysis[1] of a recent publication of mine on the prevention of peritoneal adhesions, you call attention to the fact that it would be unwise to interfere with the fibrin-forming function of the peritoneum since it is through this function that the peritoneum limits the spread of infection by the agglutination to one another of contiguous fibrin-coated viscera. And you go on to say that the writer "tacitly assumes that the average surgeon would desire to see a profuse flow of serous fluid emerge from his abdominal drainage-tubes, inserted for peritonitis, at the expense of the fibrin-forming and thereby infection-localising power of the peritoneum." This increased lymph flow, you point out, provides a suitable medium for the growth of streptococci, the common cause of peritonitis, and because of its very fluidity prevents the migration of leucocytes.

[1] THE LANCET, Jan. 21st, p. 144.

These suggestions and criticisms would be logical and just if I had suggested the routine prevention of fibrin formation in peritonitis. In my paper I indicated a method, proved experimentally, for preventing the encapsulation of drains inserted in the normal peritoneum, and in the presence of a so-called chemical peritonitis, produced by tincture of iodine. I stated the opinion that the method had possibilities in the treatment of bacterial peritonitis. At the present time I am carrying on the second phase of this work, dealing with the bacterial peritonitis. It is not my intention to prevent fibrin formation and thereby increase the area of peritoneum involved in the infective process. I believe that it would vastly increase the mortality from peritonitis were we routinely to prevent or interfere with fibrin formation. But in the virulent forms of peritonitis evidence of fibrin is frequently absent. We have found, experimentally, that in the most virulent form of the disease the fluidity of the exudate is greatly increased, and there is not the slightest trace of fibrin, as shown by a total absence of agglutination.

Under such conditions I believe that the use of hypertonic dextrose solution will not interfere with the most important of the normal defence mechanisms of the peritoneum. The flow from the drainage-tube, instead of being a pure serous fluid, would contain a large percentage of toxic exudate. The drainage of this toxic exudate, instead of permitting its absorption, is as much to be desired as in the case of thoracic empyema. That the increased lymph flow provides a suitable medium for the growth of streptococci, is in this instance correct. But this increased lymph flow contains a considerable amount of dextrose. It has been shown by Kendall and others that the streptococcus, as well as other types of virulent pathogenic bacteria, in the presence of a medium containing dextrose, becomes converted into harmless gas-producing organisms.

I am, Sir, yours faithfully,

Chicago, April 4th, 1928. J. R. BUCHBINDER.

NASAL OBSTRUCTION AS A CAUSE OF DEAFNESS.

To the Editor of THE LANCET.

SIR,—I think Mr. Macleod Yearsley must have misunderstood me. I wrote nothing in deprecation of resection. In fact, the second case to which I referred in my letter was treated by the removal of a septal spur by an antiquated method which, although it gave excellent results, was not comparable to a submucous resection. My experience has convinced me that resection and the cautery may be supplementary or alternative methods, or that either alone may be clearly indicated. During the war I was appointed surgeon to a hospital reserved for officers of the Air Force. One of the primary objects of the hospital was the treatment of nasal conditions; and one of the first cases I treated was an officer who had had his tonsils and septum removed privately before admission. He was sent into hospital because pronounced nasal obstruction was still evident. Both operations had been skilfully performed. The result of a few cauterisations was to convert an apparent failure into a complete success. The history of that case has many times repeated itself.

In reply to the criticism that the use of the cautery necessarily leads to the injurious destruction of the secreting surface, I will describe the method I employ. My object is, of course, to produce not a passage but a scar which on shrinking will drag the surface down to the bone. I use a fairly substantial platinum wire (about 1 mm. in diameter) as a cautery point. Owing to the movements of the hand this creates a wound about 2 mm., or possibly 1/10 in. in width. If a vertical section were made through the middle of one of the nasal fossæ, and a narrow strip of mucous membrane were removed at the site of section, it would measure between 5 and 6 in., and the greater part consist of respiratory membrane. If the area which this represents be contrasted with the scar resulting from the use of the cautery, I submit that the effect of the latter is negligible. This reasoning would be fallacious if the second criticism were valid that the surface was injured over an extensive indefinite area round the site of cauterisation. Anyone can satisfy himself that this is not so by repeating an experiment which I made to verify this point. I split the end of a small wooden match and I wound the frailest fragment of cotton-wool round one of the limbs. I then dipped it in water and laid it horizontally on the side of my first finger with the naked limb uppermost. I found that I could cauterise the naked limb through without causing discomfort. A friend measured the distance of the cautery point from my finger at the conclusion of the experiment and as far as we could judge it was the 1/12 in. The experiment revealed the advisability of using a cautery at the lowest practicable temperature. The object of the wet cotton-wool was to prevent the wood conveying heat to the finger, and to ascertain if moisture in the nose was a contra-indication to the use of the cautery.

The necessity of cilia for the maintenance of drainage depends on the angle which the surface to be drained makes with the horizontal, and whether drainage is assisted or opposed by gravity. On the upper and lower surfaces of the turbinals and on the floor of the fossæ it is necessary: but on the smooth vertical surface of the turbinal its function must be limited to filtration. In private practice the ill-effects of treatment come under observation, and shortly before the war, in verifying a cocaine account, it transpired that I had anæsthetised 1700 cases in six months. I feel, therefore, justified in asserting that ill-effects resulting from the scientific use of the cautery are exceedingly rare. The desiderata are delicacy, and that neither manipulation nor examination should be made unless both hands and instruments are effectively sterilised. This applies to the application of the cautery, but particularly to the preparation of the nose, which involves touching cotton-wool, and foot-controlled basins, which I had in both consulting-rooms, are highly desirable. I have stood behind men drying the mucous membrane and would have regarded it as a miracle if it escaped injury. The conjunctiva, if anæsthetised, would not have been similarly treated, and yet it is hardly more sensitive.

I am, Sir, yours faithfully,

H. MACNAUGHTON-JONES.

Eton-avenue, Swiss Cottage, N.W., April 15th, 1928.

TONSILLECTOMY AND RHEUMATISM.

To the Editor of THE LANCET.

SIR,—Dr. Ogilvie and I were fully alive to the criticism to which we were exposed by the small number of our cases; not that our figures were liable to error, but that our conclusions from so small a series of cases might prove unconvincing. The difficulty in assessing the value of conclusions drawn from a small number of cases lies rather in the uncertainty that the cases were a "fair sample" than in the figures themselves; and Dr. Stallybrass, whose interesting criticism of our figures appeared in your issue of April 14th, will doubtless admit that calculations of probable error are themselves fallacious when applied to small numbers.

In the death-rates shown in Table II. of our paper (of 35 tonsillectomy cases 3 died (8·7 per cent.), and of 45 non-tonsillectomy cases 6 died (13·3 per cent.)), Dr. Stallybrass calculates a probable error of ±4·8 per cent. in a difference of 4·6 per cent. I suggest that in these figures there is no possible error, and that calculations of probable error are valueless. By his paraphrase of our Table IV. Dr. Stallybrass appears to have fallen into an error which invalidates his final criticism of our figures. Table IV. was as follows.

TABLE IV.—*Rheumatic Children.*

Heart condition.	Healthy throats.	Tonsils and glands.
	Number and percentage.	Number and percentage.
Normal (27 cases)	20 (74)	6 (20)
Damaged (20 cases) ..	9 (45)	9 (45)
Cardiacs (24 cases)	8 (33)	15 (62·5)

In his paraphrase Dr. Stallybrass substituted "normal tonsils" for "healthy throats"; but since of the 20 children, with normal hearts, who also had healthy throats, 15 had had their tonsils removed, it seems to me unfair to classify them as having normal tonsils. Nor can I agree with the criticism that "this shows that the figures are sufficient to indicate that rheumatic persons with normal tonsils are definitely less likely to have developed heart disease than those with diseased tonsils. . . ." Perhaps in view of the above Dr. Stallybrass will agree with me that rheumatic children who have had their tonsils removed are definitely less likely to develop heart disease than those who have retained diseased tonsils.—I am, Sir, yours faithfully,

Birmingham, April 16th. K. DOUGLAS WILKINSON.

LECTURERS ON SOCIAL HYGIENE.

To the Editor of THE LANCET.

SIR,—Owing to the numerous calls the British Social Hygiene Council are in need of the services of additional medical men: 1. Those who would be willing to leave London and to undertake from three to ten days' lecturing with public health films in the provinces. 2. Those with experience in popular speaking willing to address general industrial audiences on problems of social hygiene in London and the Home Counties area. Full particulars are given in your advertisement columns.—I am, Sir, yours faithfully,

A. H. HARKNESS,
Hon. Medical Secretary, British Social Hygiene Council.

Carteret House, Carteret-street, S.W., April 16th, 1928.

ALLEGED OVER-PRESCRIBING.

To the Editor of THE LANCET.

SIR,—You summarised last week (p. 776) a report presented to the East Sussex Insurance Committee, criticising the procedure adopted by the Ministry of Health in the case of a panel practitioner whose prescribing exceeded the average cost for the area. I should like to give the other side of the picture. I cannot see why anyone should object to having his panel prescribing criticised by the Regional Medical Officer as often as may be considered necessary. Such an interview is vastly preferable to having one's already meagre pay docked by the Minister, or even having to attend a panel committee at a distance. Give me the R.M.O every time, especially if he happens to be the shrewd and helpful Scotsman who came down to me the other day. I do not think it is generally realised that it is one of the functions of the R.M.O. to try to make a working success of a somewhat unsatisfactory and difficult service, turning at times a blind eye to the letter of the law. These officers appear to be liaison officers rather than instruments of the unlovely panel machine. As a result of the kind advice of the R.M.O. and of a desire to save my pocket from being mulcted, I have altered my standard of prescribing. When a patient requires a valuable drug which is not in the Pharmacopœia I give him a private prescription and tell him to buy it for himself. In this way I have greatly reduced my drug bills, but where the patient is too poor or too mean to buy good drugs for himself, it takes him longer to get well, and off the hands of his society.—I am, Sir, yours faithfully,

April 17th, 1928. EAST SUSSEX G.P.

Obituary.

RICHARD LANE JOYNT, O.B.E., M.D. DUB., F.R.C.S. IREL.

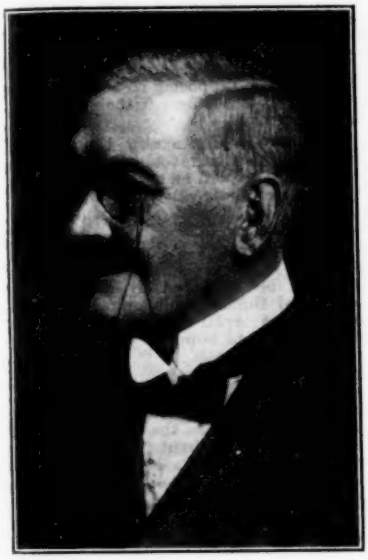
THE death of Mr. Lane Joynt occurred in Dublin at Easter after a few days' illness, at the age of 61. Born in Dublin, the son of a solicitor, he was educated at Trinity College, where he graduated in 1890. He proceeded to the Fellowship of the Royal College of Surgeons in Ireland in 1894, and subsequently was for many years a member of the Council of that body. Early in his professional life he was appointed assistant surgeon to the Meath Hospital and for the last four or five years of his life was its senior surgeon. During all his hospital career he performed the routine duties of a hospital surgeon punctiliously and competently, but he was always specially interested in mechanical problems. Radiography came into use while he was still a junior surgeon, and he was at once attracted by its great possibilities. As one of the early workers with X rays his hands became gravely affected by dermatitis and for a time he was unable to perform any ordinary surgical work, though nothing could make him idle. So bad did his condition become that the question of double amputation was raised, but less rigorous methods fortunately proved successful, and a series of grafting operations carried out a year or two ago left him again with the full use of his hands. This was to him of the greatest importance, for he was a mechanic of rare skill, equally at home in carpentry and metallurgy; an example of his ingenuity is seen in the note on Skin-grafting sent to THE LANCET shortly before his death and published on p. 816 of this issue. His special choice in surgery was the treatment of injuries of bone and of deformities, and he was one of the early surgeons to carry out the plating of fractures with metal plates. During the war his real forte was found in the planning and manufacture of surgical and orthopædic apparatus, and in his own workshops he organised the manufacture of splints and other apparatus for the treatment of deformities, obtaining the help of many willing volunteers. Subsequently his work was officially recognised by the War Office, and he was appointed Inspector of Orthopædics with the rank of Lieut.-Colonel. His particular task was the devising of proper apparatus for dealing with unusual deformities, and in the more difficult cases he not only devised, but completed the manufacture of the article with his own hands. In work of this kind surgeons throughout the kingdom were glad to have his assistance.

Apart from his professional work Joynt had many interests. He loved handicrafts, he was a pioneer motorist and an expert yachtsman. Furthermore, he was a man of wide general reading, and thoroughly companionable, never seeking publicity and never rating his claims high. By his death the profession loses a good surgeon, a craftsman, and a man of principle.

JOHN STEPHEN McARDLE, M.CH. R.U.I., F.R.C.S. IREL., J.P.

Mr. J. S. McArdle died at his residence, Merrion-square, Dublin, last Saturday, after a long and painful illness. Sixty-nine years of age, he was born in Dundalk and received his early education at St. Mary's College in that town. His immediate intention in boyhood was to become a jockey, and he was actually apprenticed for a time to a trainer of racehorses. Though this idea had to be abandoned in favour of his father's profession of medicine, he retained to the end of his life an enthusiasm for the turf. After studying medicine at the Cecilia-street (Catholic University) School of Medicine in Dublin he received the licences of the Royal Colleges of Physicians and of Surgeons at the early age of 21, and became a Fellow of the Royal College of Surgeons in Ireland in 1884. While still a very young man he was appointed to the surgical staff of St. Vincent's Hospital,

to which institution he remained attached for the rest of his life. He was also professor of surgery in the Cecilia-street School, and in 1903 was elected a Fellow of the Royal University, which in 1900 had conferred on him the honorary degree of Master of Surgery. When the National University replaced the Royal he was appointed professor of surgery in the Dublin College. In his early days he contributed frequently to the medical journals, and he wrote some useful books for students; but in later life the calls of practice were too many to leave him leisure for writing.



MR. J. S. MCARDLE.
Photograph by Lafayette, Dublin.

"As an operating surgeon," writes a colleague, "McArdle early made a name for himself, and for the last 40 years he has been one of the best known surgeons in Ireland. He was quick in decision, clear in emergency, and precise in execution. His forceful character inspired confidence. As a teacher he was probably at his best. His clearness, his force, his humour made his lessons to be remembered. But apart from his skill as a surgeon and his capacity as a teacher, McArdle had a great personality. In his company one knew that he was something out of the common. His joy of life, his verve, his great-heartedness, his boyishness, made him friends everywhere and in every company. There were few men in the profession who had so many friends, and he was as loyal to his friends as they were to him. Ireland is to-day the poorer by the loss of a generous, a kindly, and a lovable son."

Mr. McArdle was twice married, having two sons and two daughters. He was a member of the Senate of the National University of Ireland and President of the Irish Medical Association.

CAVENDISH FLETCHER, M.B. LOND.

THE death of Dr. Fletcher on March 3rd, after a brief illness, at the age of 45, removes an able exponent of clinical pathology. He was born in London, the son of Alfred E. Fletcher, sometime editor of the *Daily Chronicle*, and was brought up in an atmosphere of devotion to justice and fair play which remained characteristic of him throughout life. He went to Wilson's Grammar School and London University, taking his clinical studies at Westminster Hospital, from which he qualified M.B., B.S. Lond., in 1906. After a house appointment there he went on to the County Asylum at Leek, and the Union Hospital at Sheffield, developing at these places a taste for clinical pathology, which led to an appointment as pathologist to the Royal Southern Hospital at Liverpool. In 1908, however, he joined the staff of the (London) Laboratories of Pathology and Public Health, and for the last eight years held the senior post of Director. At the same time he was honorary pathologist to the King Edward Memorial Hospital at Ealing. "Much of the intense labour which Fletcher devoted to technical problems, will," writes one of his colleagues, "never be known to the world, but his co-workers gained immense help from him. Engrossed in the pursuit of clinical pathology, his sole preoccupation was concerned with its advancement, with perfecting its technique, and with simplifying the means of attaining this. Thorough master of all the present-day ramifications of pathology, he excelled especially as morbid histologist, his verdict on the interpretation of microscopic sections being rarely falsified by the subsequent events." Eight or nine years ago, in collaboration with Prof. Hugh MacLean, he published a little book which aimed at guiding the practitioner in his relations with the pathological laboratory and at solving the difficulties, so far as they can be solved, of a scheme in which pathologist and laboratory are not in close proximity to practitioner and patient. Dr. Fletcher married Ellen, a daughter of Mr. R. Strain, and sympathy is felt with his widow, left with the care of a son and a daughter.

EDGAR WILLIAM WILLETT, M.D. OXF., F.R.C.S. ENG.

WE regret to record the death of Dr. Edgar Willett on April 13th after a brief illness. He was born on April 5th, 1856, at Brighthelmstone, as it was then called, where his father, Mr. Henry Willett, a wealthy brewer, was a well-known figure for many years, and bequeathed to the town a valuable collection of ceramics and other exhibits, now housed in the museum adjoining the Brighton Pavilion. To his father Edgar Willett owed the early training in natural history, and the interest in various branches of art which remained for his life-time a valuable inheritance. He went to school at Wellington, and proceeded to New College, Oxford, as a commoner, whence he took a 1st class Natural Science degree in 1879, became M.B. in 1885, and M.D. in 1904, having been made a Fellow of the Royal College of Surgeons in 1888. His choice of medical school fell on St. Bartholomew's, where his cousin, Mr. Alfred Willett, had recently been appointed full surgeon. After serving as his house surgeon, Edgar Willett became assistant anæsthetist under Mr. J. Mills, and succeeded Mr. Richard Gill on his retirement. He specialised as an anæsthetist in London for many years, residing in Queen Anne-street, and was President of the Society of Anæsthetists in 1905–06. He was also assistant surgeon to the Metropolitan Hospital, and surgeon to the Belgrave Hospital for Children. Not a voluminous writer, he contributed various articles to the St. B.H. Reports, and to the Transactions of the Pathological Society.

Edgar Willett retired from practice about 1906, and lived at a charming house in Worth Park, Sussex, where he occupied himself in local affairs, and was on the county council of East Sussex. He retained a keen interest in prehistoric archæology, and contributed articles on Flint implements to the journals of the Sussex Archæological Society and the Anthropological Institute. He was one of the original recruits in the London Volunteer Medical Corps, and was commissioned as Captain. Retiring with this rank he served again during the war chiefly at a hospital in Croydon, and was retired as Major, R.A.M.C., after the Armistice. In 1923 he bought a house at Hartfield, which he filled with treasures of furniture, pictures, and pottery, largely inherited from his father's extensive collections.

The friend and contemporary, to whom we owe most of these biographical details, remarks that Willett always maintained touch with his old hospital, and had a wide circle of old Bart.'s friends. Until the last few years his house was a centre of warm hospitality, but for some years his powers had been on the wane, and an increasing deafness impaired the great social qualities which had distinguished him. Never athletic or good at any game, he remained a good shot to his old age, and though he never hunted he was constantly to be found on foot at meets and covert sides. He was unmarried.

Medical News.

UNIVERSITY OF CAMBRIDGE.—At a recent examination the following candidates were approved:—

DIPLOMAS IN PUBLIC HEALTH, HYGIENE, AND TROPICAL MEDICINE AND HYGIENE.

Part I.—Baharsing Jagatsing Ajwani, Manmohan Singh Batra, *Colin Fraser Brockington, Bertha Margaret Butters, Ryder Carrel Dracup, Ishac Kirolos Gayid, Margaret Ann Glass, Nityaranjan Gupta, *Girgis Abdel Messih, Jean Hall Morton, Robert Arthur Welsford Procter, Effie Scott Stephen, Jagan Nath Vasudeva, Donella Anna Ferguson Watson, Dorothy Watterson, Percival Clarence Wickremesinghe, and *Koh Cheang Yeo.

* Distinguished.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—At a quarterly meeting of the Council held on April 12th, Sir Berkeley Moynihan, the President, in the chair, the John Hunter Medal in bronze with the Triennial Prize of £50 was awarded to Mr. Victor Ewings Negus, M.S., F.R.C.S., for his investigations into the comparative anatomy and physiology of the larynx and the anatomy of the bronchi in their relation to surgery.—Mr. Charles Thurstan Holland, Ch.M. Liverp., and Sir Matthew Henry Gregson Fell, K.C.B., C.M.G., Director-General of the Army Medical Service, as Members of the College of 20 years' standing, were elected to the Fellowship.

No award of the Jacksonian Prize for the year 1927 was made. The subject of the essay for the Jacksonian Prize for 1929 will be the Pathology, Diagnosis, and Surgical Treatment of Diseases of the Salivary Glands.

A letter was read from the Canadian Medical Association approving the revised scheme for conducting Primary Fellowship Examinations in Canada, and conveying the thanks of the Executive Committee of that Association for the very efficient and generous provisions made. An account of the scheme will be found on p. 831.

Diplomas of Member were conferred upon the following who have passed the requisite examinations and have now complied with the by-laws of the College, viz.: A. D. W. Cooke, M.B., B.S. Durh., Durham and St. Mary's; S. McGladdery, St. Bart.'s; H. H. Mahmood, M.B., B.S. Punjab, Punjab and Middlesex; J. W. Notley, Birmingham; and Joan M. Oldaker, Royal Free.

The Hallett Prize at the Primary Fellowship.—The Council, being desirous of showing their appreciation of the services of Sir Frederic Hallett in connexion with the examinations for the Fellowship and the Licence in Dental Surgery during the long period of 50 years, from 1877 to 1927, and Sir Frederic Hallett having expressed a wish that the personal gift which it was proposed to make to him should take the form of the endowment of a prize to bear his name, it has been agreed that stock be purchased by the treasurers of the College on behalf of Sir Frederic Hallett and that the interest from the fund so established be expended on a prize called the Hallett Prize, to be awarded under the following regulations: The Hallett Prize shall be open to candidates admitted for the first time to the Primary Examination in Anatomy and Physiology for the Fellowship conducted by the board of examiners in this country. The Prize at each examination shall consist of a sum of 5 guineas with a certificate of the award of the Prize. The Prize shall be awarded to the eligible candidate, if any, obtaining the highest marks, who shall have reached a standard considered by the examiners sufficiently high to justify the award of the Prize. If two or more candidates are found to have reached the required standard and to have been allotted the same number of marks, being the highest obtained by any eligible candidate, it shall be open to the examiners to take such steps as they may think desirable to enable them to adjudicate in the matter.

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY.—A course of lectures on Pathological Research in its Relation to Medicine will be held in the bacteriological department of this institute at 5 P.M. on Thursdays, from April 26th to June 14th inclusive. The first lecture, on the Bactericidal Power of the Blood, and the Appraisement of the Value of Therapeutic Agents, will be given by Sir Almroth Wright, F.R.S., principal of the institute, on April 26th. The other lecturers will be Prof. D. W. Carmalt-Jones (Iodine in Relation to Goitre), Prof. E. C. Dodds (the Ovarian Hormone), Prof. Hamilton Hartridge, F.R.S. (Poisoning by Coal Gas and Products of Combustion), Prof. R. H. A. Plimmer (Some Recent Researches on Vitamins), Dr. G. V. Anrep, F.R.S. (Pathology of Conditioned Reflexes), Sir Oliver Lodge (The Uses we make of the Ether of Space), and Dr. Paul Fildes (Principles of the Treatment of Tetanus with Antitoxin). The lectures will be open without fee to all members of the medical profession and to students in medical schools.

AUXILIARY R.A.M.C. FUNDS.—The annual meeting of the members of the Auxiliary Royal Army Medical Corps Funds will be held on Friday, April 27th, at 2.30 P.M., at 11, Chandos-street, Cavendish-square, London, W. 1.

BRITISH ORTHOPÆDIC ASSOCIATION.—The Spring meeting of this association will be held in Paris on Friday and Saturday, April 27th and 28th.

ROYAL SANITARY INSTITUTE.—A sessional meeting will be held on Friday and Saturday, April 27th and 28th, in the Guildhall, Worcester. Subjects of discussion will include river pollution, infant mortality, and activated sludge. On Saturday, May 5th, at 10 P.M., at the Guildhall, Preston, a discussion on the present position of the milk-supply will be opened by Prof. F. E. Wynne, Dr. R. Veitch Clark taking the chair. In the afternoon visits will be paid to places of interest. Those proposing to attend should notify Dr. F. A. Sharpe, Health Office, Tithebarn-street, Preston, not later than April 27th.

UNIVERSITY OF LONDON: *University College.*—A course of three lectures on the Pharmacological Evidence for Modern Methods of Treatment will be given by Dr. J. H. Burn at University College, Gower-street, W.C., on Tuesday, Wednesday, and Thursday, May 1st, 2nd, and 3rd, at 5 P.M. Admission free without ticket.

UNIVERSITY OF BIRMINGHAM.—A course of ten William Withering Memorial Lectures on Industrial Maladies and Factory Hygiene will be delivered by Sir Thomas Legge at the Medical School Buildings, Edmund-street, at 4 P.M. on Wednesdays from April 25th to June 27th inclusive. Admission cards will be supplied on application to the acting Dean, Prof. J. C. Brash.

INDIAN MEDICAL SERVICE.—The annual dinner of the I.M.S. will be held at the Trocadero Restaurant, London, on Wednesday, June 20th, at 7.15 P.M., Major-General Sir Richard Havelock Charles in the chair. Further particulars may be had from the joint hon. secretary, Major Sir Thomas Carey Evans, M.C., at 31, Wimpole-street, London, W. 1.

BRITISH EMPIRE CANCER CAMPAIGN.—Sir John Bland-Sutton (Vice-Chairman) presided at the quarterly meeting of the Grand Council of the British Empire Cancer Campaign held on April 17th. On the recommendation of the Scientific Advisory Committee the Grand Council approved the following grants: £200 for one year to Dr. Louis Cassidy, to be applied through the new National Cancer Campaign (Ireland); £300 for one year to Mr. Harold Burrows, working at the Cancer Hospital (Free); £300 to Mr. C. F. W. Illingworth for one year for work to be carried out at Edinburgh University; and £1000 for the ensuing year for work to be carried out under the supervision of Mr. F. C. Pybus, at Newcastle-on-Tyne. On the recommendation of the Executive Committee the Grand Council also granted a sum of £400 to St. Mark's Hospital, City-road, and £100 to the Medical Society of London towards expenses incurred in the preparation and publication of statistical investigations recently carried out by that Society. The Grand Council received reports from the various committees in charge of the preparations for the International Conference on Cancer, to be held during July. Already 40 acceptances have been received from foreign representatives in all parts of the world, and over 100 delegates have been nominated by the leading universities, medical schools, and scientific and medical societies of the British Isles and the British Dominions overseas.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

REASSEMBLY OF THE HOUSE OF COMMONS.

THE House of Commons reassembled after the Easter recess on Tuesday, April 17th. The House of Lords reassembled on Thursday, April 19th.

THIRD PARTY INDEMNITY INSURANCE BILL.

In the House of Commons on Tuesday, April 17th, Mr. ATKINSON asked leave to introduce a Bill to provide for the direct discharge of third party liability by insurers. He explained that the object of the measure was to make it the duty of an insurance company in so far as they were liable for third party claims to pay those claims direct to the injured person. It did not entitle the claimant to take proceedings direct against the insurance company for the purpose of establishing liability or the amount of liability, but once that liability was admitted, or established by legal proceedings, the insurers were then to hold the money in trust for the injured person and were under no obligation to pay the money over direct.

Leave to introduce the Bill was granted without a division and the Bill was read a first time.

THE PETROLEUM AMENDMENT BILL.

The Petroleum (Amendment) Bill was considered on Report on April 17th.

On Clause 4 (which makes regulations as to classes of petroleum likely to be dangerous or injurious to health).

Mr. HARDIE moved an amendment giving the Home Secretary power to prohibit the sale or use of petroleum spirit which he might, by Order, declare to be so dangerous or injurious to health that precautions for the protection of persons employed or engaged in handling or using such petroleum spirit were impracticable. He said that the amendment referred to lead tetraethyl in petrol.—Sir W. JOYNSON-HICKS (Home Secretary) said that he would accept the amendment. Lead tetraethyl in petrol was now the subject of an inquiry, and if the Home Secretary should, as a result, declare that this particular spirit was injurious to health, the amendment would be useful.

The amendment was agreed to.

The report stage was completed and the Bill was read a third time.

HOUSE OF COMMONS.

TUESDAY, APRIL 17TH.

Dysentery in Sinarango Prison Camp.

Mr. DAY asked the Secretary of State for the Colonies the number of prisoners who were affected by dysentery in the Sinarango prison camp, Malaita, while awaiting trial for the murders that occurred last October; and the number of deaths which occurred.—Mr. AMERY replied: 71 cases of dysentery have occurred among the prisoners and there have been eight deaths. Seven cases were still under treatment on April 2nd.

Voluntary Venereal Disease Clinics in Scotland.

Mr. BUCHANAN asked the Secretary of State for Scotland the number of towns in Scotland of a population of 10,000 and over which had no voluntary clinics for dealing with the problem of venereal disease; if he could give the names of these towns; and if he was at present taking any steps to urge those local authorities to set up clinics.—Sir JOHN GILMOUR replied: The number of towns in Scotland with a census population of 10,000 or over, and without a public clinic for dealing with venereal diseases is 26, of which seven have a population of 20,000. These burghs, in order of population, are: Clydebank, Falkirk, Airdrie, Rutherglen, Dumbarton, Port Glasgow, Inverness, Musselburgh, Hawick, Buckhaven, Methil and Innerleven, Rothesay, Dunoon, Cowdenbeath, Renfrew, Saltcoats, Peterhead, Galashiels, Johnstone, Alloa, Kirkintilloch, Barrhead, Montrose, Lochgelly, Fraserburgh, Bo'ness, and Gourock. In three of these burghs—Falkirk, Inverness, and Rutherglen—provision of a venereal disease clinic is in course of being made, or under active consideration. Four of these burghs—Airdrie, Port Glasgow, Musselburgh, and Gourock—are so conveniently situated for the clinics of adjacent larger towns as not to require independent provision. The remaining 19 burghs are served to a greater or a less extent by the nearest available clinics of other towns. In 11 of these burghs the Scottish Board of Health have not thought the question of providing a local clinic to be sufficiently urgent to call for pressure by them upon the Local authorities, having regard to the facilities available in neighbouring towns. In the case of the remaining eight burghs—Clydebank, Dumbarton, Hawick and Galashiels, Peterhead and Fraserburgh, Saltcoats and Kirkintilloch, the question of establishing a burgh clinic or a joint clinic has been considered by the responsible local authority, and remains open. The development of the schemes in all areas is being carefully watched and reviewed by the Board.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, April 23rd.—8 P.M., ODONTOLOGY. Paper: Dr. Alexander Livingston: Further Experiments on the Permeability of Enamel. Casual Communications: Mr. W. Rushton: Injection of Alcohol for Neuralgia and its Sequel. Mr. Lewin Payne: A Paste for Obtunding Hypersensitive Dentine.
TUESDAY.—5 P.M., MEDICINE. Paper: Prof. Snapper (Amsterdam): The Rôle of the Kidney in Non-renal Disorders. Demonstration: Dr. A. F. Hurst and Dr. P. J. Briggs: Radiological Demonstration Illustrating Unusual Alimentary Disorders.
THURSDAY.—8.30 P.M., UROLOGY. Clinico-pathological Evening.
FRIDAY.—4.30 P.M., DISEASE IN CHILDREN (at the London Hospital, E.). Tea will be served at 4.30 P.M. Cases will be shown.—8 P.M., EPIDEMIOLOGY. Paper: Dr. Allan C. Parsons: Post-encephalitis and its Problems.—8.30 P.M., ELECTRO-THERAPEUTICS. Short Papers: Dr. R. W. A. Salmond: Observatjons on the Movements of the Duodenal Contents, with Special Reference to Antiperistalsis and Pyloric Regurgitation. Dr. Bathurst: Treatment of the Incontinence in Women.

ROYAL SOCIETY OF ARTS, John-street, Adelphi.
WEDNESDAY, April 25th.—8 P.M., Mr. J. M. Ritchie, Ph.D.: The Education and Training of the Blind.

INSTITUTE OF HYGIENE, 28, Portland-place, W.
WEDNESDAY, April 25th.—3.30 P.M., Dr. J. B. Alexander: Early Signs and Symptoms of Rheumatic Infections.

MEDICO-LEGAL SOCIETY, 11, Chandos-street, W.
THURSDAY, April 26th.—8.30 P.M., Dr. John Glaister, Jun., Barrister-at-law: Hair: Considered Medico-Legally.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W.
FRIDAY, April 27th.—8.30 P.M., a Paper will be read by Dr. Archibald Leitch on Syphilis in Relation to the Ætiology and Diagnosis of Malignant Disease.

ILLUMINATING ENGINEERING SOCIETY.
TUESDAY, April 24th.—6 P.M. (in the Home Office Industrial Museum, Horseferry-road, Westminster, S.W.), Inspection of Lighting Exhibits. 6.30 P.M., Discussion on Artificial Light, to be opened by Mr. J. S. Dow.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY, Paddington, W.
THURSDAY, April 26th.—5 P.M., Sir Almroth Wright, F.R.S.: The Bactericidal Power of the Blood and the Appraisement of the Value of Therapeutic Agents.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham.
MONDAY, April 23rd.—2.30 to 5 P.M., Medical, Surgical, and Gynæcological Clinics. Operations.
TUESDAY.—2.30 to 5 P.M., Medical, Surgical, Throat, Nose and Ear Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M., Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M., Dental Clinics. 2.30 to 5 P.M., Medical, Surgical, and Ear, Nose and Throat Clinics. Operations.
FRIDAY.—10.30 A.M., Throat, Nose and Ear Clinics. 2.30 to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.
On Tuesday and Friday, at 2.30 P.M., there will also be demonstrations of Throat, Nose and Ear and Medical Cases (Children) by Mr. W. Ibbotson and Dr. C. E. Sundell respectively.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, April 23rd, to SATURDAY, April 28th.—CITY OF LONDON HOSPITAL FOR DISEASES OF THE HEART AND LUNGS, Victoria Park, E. Tues., 10 A.M., Ward Round by Dr. V. S. Hodson. 2 P.M., O.P. Demonstration. The practice of the hospital is open for the day, and the above clinics are free to medical practitioners.—HOSPITAL FOR DISEASES OF THE SKIN, Blackfriars-road. Special Course, afternoons only (second week).—ROYAL FREE HOSPITAL, Gray's Inn-road, W.C. Wed., 5.15 P.M., Dr. Heald: Lecture-demonstration.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E. Special Course in Medicine, Surgery, and Gynæcology.—LONDON SCHOOL OF TROPICAL MEDICINE, Endsleigh-gardens, W.C. Tues., 2 P.M., Lecture-demonstration by Dr. Carmichael Low. Thurs., 2 P.M., Lecture-demonstration by Dr. Manson-Bahr. Further particulars from the Secretary, Mayfair 2236.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, April 27th.—4 P.M., Dr. Dan McKenzie: Dental Cysts.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, April 24th.—4.15 P.M., Mr. A. H. Burgess: Renal Tuberculosis.
FRIDAY.—4.15 P.M., Mr. G. Jefferson: Demonstration of Neurological Cases.

Appointments.

ALLAN, J., M.D., B.Ch. Edin., D.P.H., has been appointed Ophthalmic Surgeon at the Downham (L.C.C.) Treatment Centre.

AMYOT, T. E., M.B., B.S. Durh., a Medical Referee under the Workmen's Compensation Act for Chester, and Holywell, Flint, and Mould Circuits.

BAIRD, J. E., M.B., Ch.B. Belf., Medical Officer to the Holt Line.

LAMONT, D. C., M.B., Ch.B. Edin., D.P.H., Medical Officer of Health, City of Lincoln.

MARTYN, F. D., L.R.C.P. Lond., M.R.C.S., Certifying Surgeon under the Factory and Workshop Acts for Sutton in Ashfield.

Vacancies.

For further information refer to the advertisement columns.

All Saints' Hospital, Vauxhall Bridge-road, S.W.—Temp. Non-Res. H.S. At rate of £150.

Alton, Hants, Lord Mayor Treloar Cripples' Hospital and College. Second Asst. Res. M.O. £300.

Basingstoke, Hants, Park Prewett Mental Hospital.—Second Asst. M.O. £450.
Birmingham and Midland Ear and Throat Hospital.—Asst. Surg. O. £200.
Birmingham City Infectious Diseases Hospitals, Little Bromwich.—3rd Asst. M.O. £350.
Bournemouth, Royal National Sanatorium for Consumption, &c.—Laryngologist.
Bristol General Hospital.—Pathologist and Curator of the Museum. £500.
Bristol Royal Infirmary.—Hon. Surg. in charge of Ear, Nose and Throat Dept.
British Social Hygiene Council, Carteret House, Westminster, S.W. Lecturer on V.D. &c.
Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100.
Central London Throat, Nose and Ear Hospital, Gray's Inn-road, W.C.—2nd Res. H.S. At rate of £75.
Chelmsford, Administrative County of Essex.—Two Asst. County M.O.H.'s. Each £600.
City of London Hospital for Diseases of Heart and Lungs, Victoria Park, E.—M.O. At rate of £100.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—H.S. and Whole-time Cas. O. Each at rate of £125.
Exminster, Devon Mental Hospital.—Jun. Asst. M.O. £300.
Farringdon General Dispensary, Holborn-circus, E.C.—Hon. Phys.
Fiji Government.—Dist. M.O. £500.
Glasgow Royal Infirmary.—Deputy Med. Supt. and Sen. Med. Resident. £200.
Gloucestershire Royal Infirmary.—Asst. H.S. At rate of £120.
Golden-square Throat, Nose and Ear Hospital, W.—Hon. Consulting Ophth. S. Also H.S. £100.
Hospital for Sick Children, Great Ormond-street, W.C.—Med. Reg. and Pathologist. £300.
London Hospital, E.—First Asst. and Reg. to one of the five Surg. Firms. £300.
Newcastle-upon-Tyne, Education Committee.—Asst. Sch. M.O.
Rotherham Hospital.—H.P. £180.
Royal Eye Hospital, St. George's-circus, Southwark, S.E.—Res. H.S. and Asst. H.S.
St. John's Hospital for Diseases of Skin, Leicester-square, W.C.—Hon. Asst. Phys.
St. Mary's Hospital, W.—Surg. in charge of Out-patients.
St. Peter's Hospital for Stone, Henrietta-street, Covent Garden, W.C.—3rd Anæsthetist. At rate of £25.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—Registrar. £100.
Stoke-on-Trent, City Education Committee.—Asst. Sch. M.O. £500.
Stoke-on-Trent, North Staffordshire Royal Infirmary, Hartshill.—Hon. Anæsthetist, Hon. Asst. Aural S. and Hon. Asst. Orthop. S. Also Asst. H.P. £125.
Walsall General Hospital.—Sen. H.S. At rate of £200.
York County Hospital.—H.S. £150.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Chaddesley Corbett (Worcestershire) and Crowborough (Sussex).

A vacancy is announced for a Medical Referee under the Workmen's Compensation Act for Bridgend County Court. Applications should reach the Home Office, Whitehall, S.W., not later than May 5th.

The Home Secretary gives notice that he is considering the appointment of a Medical Referee under the above Act for the district of the Bridgend County Court (Circuit No. 30). Applications for the post from duly qualified Medical Practitioners with surgical experience resident in, or in the neighbourhood of, Bridgend should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, and should reach him not later than May 5th, 1928.

Births, Marriages, and Deaths.

BIRTHS.

DE VILLIERS-PRITCHARD.—On April 17th, at 9, John-street, Mayfair, to Audrey, wife of Dr. C. W. de Villiers-Pritchard—a son.

MILLIGAN.—On April 15th, at Norfolk-square, W., the wife of Norman Milligan, M.B., of Royston, Herts, of a daughter.

MONTGOMERY.—On April 6th, at Foxhall, Osborne Park, Belfast, the wife of Dr. F. P. Montgomery, of a daughter.

MARRIAGES.

BARKER—JOHNSTON.—On Thursday, April 12th, at the Parish Church, Whitstable, Alan Barker, M.B., B.Chir., to Margery Lulu, elder daughter of Mr. J. R. J. Johnston, I.S.O., and Mrs. Johnston, Thatch House, Whitstable.

DEATHS.

PACKMAN.—On April 8th, at a nursing home, Alfred Charles Augustus Packman, M.D., J.P., for 41 years in practice at Rochester, aged 64.

SATCHWELL.—On April 8th, at North Curry, Somerset, Hubert John Satchwell, F.R.C.S.I., in his 60th year.

SHIACH.—On April 12th, suddenly, at Paris, Gordon Reid Shiach, L.D.S. (Edin.), of Rosebrae and Ardgilzean, Elgin, aged 61.

WILLETT.—On April 12th, at Spyways, Hartfield, Edgar William Willett, M.D., F.R.C.S., aged 72.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

TREATMENT OF GUNSHOT WOUNDS

AND THE IMPROVEMENT THEREOF BY AMBROISE PARÉ IN THE CAMPAIGN OF FRANCIS I. AGAINST CHARLES V. (1536–1544).*

BY THEODORE MEYER-STEINEG,
PROFESSOR OF THE HISTORY OF MEDICINE IN THE UNIVERSITY OF JENA.
(*Translation by* F. J. FRANKAU.)

THE discovery and introduction of firearms raised new questions not only for generals but for everyone directly or indirectly connected with warfare, including the medical man. The latter recognised very soon that the wounds caused by the new weapons, whilst similar in several respects to the injuries caused by the arms hitherto in use, displayed a number of special features. But, as not infrequently happens with a new problem of this sort, the judgment on these special features went far beyond the mark. A fixed opinion, based on many crass errors, was arrived at, and though these errors ought to have been clearly obvious to the eyes of an unprejudiced medical man, they brought under their spell such a large circle of otherwise not uncritical minds that, even when regard is had to the conditions of those days, we are to-day faced with an enigma.

Perhaps the extraordinarily slow spread of the new invention contributed to the obstinacy of these opinions. For it took nearly 200 years from the Battle of Crécy (1346), at which field guns were used for the first time in any quantity, until portable firearms were universally introduced into armies. And so it was not until the end of the fifteenth century that the increased numbers of wound cases afforded the surgeons proper opportunities to observe the new forms of wounds and to exchange views about them.

Earliest Methods of Treatment.

A German, Heinrich von Pfolspeundt, in his work (1460) entitled "Bündth-Ertzney," was the first to treat of gunpowder, balls, and the wounds caused by them. And in the work of another German author, Hieronigmus von Brunschwig (1497), entitled "The Book of Wound Medicine," the view is for the first time expressed that gunshot wounds are "poisoned" by the gunpowder and should be treated accordingly. Having regard to the paucity of his original remarks, it is to be assumed that Brunschwig is only retailing the opinions he gathered from others. In any case this erroneous view was widespread about the turn of the fifteenth century, even in countries where his work can scarcely have been known. Yet alongside of this quite partial opinion wider views of other surgeons are to be found. The latter consider gunshot wounds as injuries of three sorts: contusion, burning, and poisoning.[1] Foremost amongst those adopting this point of view was the Italian Vigo [2] (about 1460 to 1517), who by his authority not only influenced the theoretical views of his contemporaries, but very likely also the practical procedures which surgeons followed as a result thereof. The treatment advised by him and, which he announces with pride, was based upon his own very comprehensive experiences, displays above all else an endeavour to free the "poisoned" wounds of poison. For this purpose they should in the first place be burnt with a red hot iron (candenti ferro decoquere), or an Egyptian salva, prepared according to Avicenna's prescription, should be applied (unguentum ægyptiacum descriptione Aviccennæ administrare), or instead of this the wounds should be burnt with boiling oil of the Sambucus (ferventi oleo sambucino cauterizare), "for the cauterisation protects the patient against putrefaction of the wounds, as it ousts the poison of the gunpowder." Not for a single moment

* Ambroise Paré was born in 1510 at Bourg-Hersent, near Laval (Dép. Mayenne). He trained first as a barber and then as a surgeon at the Hotel Dieu. In 1536 he took part in Francis I.'s campaign under de Montejan, and four years later was promoted "maître barbier." After participating in further campaigns he became one of the "chirurgiens ordinaires" of Henry II. in 1552, and was admitted to the "Collège de Saint-Côme" as "maître en chirurgie." Then followed disputes with the Faculty of Medicine of Paris, as they tried to prevent the publication of his writings. On St. Bartholomew's night (1572) he only escaped with his life through King Charles IX., whose "premier chirurgien" he was, affording him his personal protection. Henry III. named him as a "conseiller." Paré died in 1590, having served as privy surgeon to four kings in succession, highly respected, but to the last opposed, if not openly, at any rate in secret, by the medical faculty.

[1] Contusion: "ratione rotunditatis instrumenti," Burning "ratione igneitatis," and Poisoning "ratione pulveris."

[2] Giovanni da Vigo, Practica in arte chirurgica copiosa. 1514. Lib. III., Tract. II., Cap. III. De vulnere facto ub instrumiento quod bombard nuncupation.

did it occur to Vigo, or to the many others who acted according to his advice, that this procedure involved a much more dangerous and deep-seated burn in addition to the serious and direct injuries to the tissues caused by the shot itself. And this, notwithstanding the fact that according to the universal report of almost all writers, the mortality of wounded persons who had been treated in this was was extraordinarily heavy. The conclusion come to was simply that the poisoning of the wounds by the gunpowder was so potent that, notwithstanding the application of the best remedies, it destroyed the body.

Through these opinions the far saner and less drastic methods of treatment of other surgeons were entirely driven into the background. For instance, the above-mentioned Hier. Brunschwig had proposed pushing a "rope of hair" through the wound channel, drawing it backwards and forwards and thereby extracting the poisonous powder from the wounds. Or, if the wound did not then commence to suppurate, a strip of bacon having one end rubbed with ox fat should be introduced into the wound passage, "so it will attract all poison to itself and no poison will remain in the cavity, and it will make the cavity suppurate." For subsequent treatment salves and plasters of various sorts were recommended. A special question arose in those cases in which the missile still remained in the body. Brunschwig had recommended that after widening the channel of the shot the ball should be extracted with bullet forceps or with an instrument named from its shape "stork's beak." Gersdorff [3] used a much larger assortment of instruments; a long bullet spoon, called "hock," a boring tool to screw into a deep-seated ball, a thick-toothed pair of tongs called "snake," or a straight pair of tongs with block ends (Klotzzange).

In the works of the many other surgeons who wrote on the treatment of gunshot wounds, we find but very few variations from this procedure. Through Vigo the opinion as to the poisoning of wounds became the paramount one and the common belief of surgeons, so that the "freeing the injury of poison" and the methods prescribed by Vigo in that behalf appeared to be the most important duty of the surgeon.

An Accidental Discovery.

Even Ambroise Paré, a usually very critical person, admits without qualification that he at first accepted this early view as to the poisoned nature of gunshot wounds and had followed the treatment prescribed by Vigo, though not quite without scruples. It was only thanks to an accident that he realised the error of his opinions and the harmful nature of the practice following from them. He describes this quite modestly in his work: "La méthode de braicher les playess faictes par hacquebutes et aultres bastons à feu: et de celles qui sont faictes par fléches, dardz, et semblables: aussy des combustions spécialement faictes par la pouldre à canon." Paris, 1545.

"In the year of our Lord 1536 Francis, King of France, who for his distinguished actions and deeds in War and Peace was surnamed 'the Great,' sent a powerful army over the Alps . . . partly to provide Turin with provisions, troops, and other necessaries and partly to recover the towns of this province which had been captured by the Count Guasto [Vasto] in command of Imperial troops. I found myself then with the Royal Army as Surgeon attached to the infantry under the supreme command of Montejan. The Imperialists had seized the Pass of Susa, the Camp of Villa, and had occupied all other approaches, so that it was only by great force that they could be driven out of those positions and the Royal Army had to open the way for itself with the sword. In this concourse and in such a conflict of armed men there were a large number wounded by shot of both sorts,[4] but specially those caused by artillery. I must, however, admit that at that time I had not burdened my spirit too much with the knowledge of surgery and especially was not yet very learned in the treatment of injuries caused by artillery. I had, it is true, read in Joh. Vigonius that wounds caused by firearms were poisoned by reason of the gunpowder. One must, therefore, in order to heal them burn them with boiling oil of elder (Sambucus) mixed with a small quantity of Theriak.[5] As, however, I had not too much faith either in the author or his remedy, and as I certainly was aware that it was impossible to use burning expedients in relation to wounds without causing the most fearful pains and worries, I desired before taking the risk myself to observe and to satisfy myself by my own eyes whether the other surgeons who were in the same camp with me made use of any other treatment of wounds. I perceived, however, that they all observed the methods prescribed by Vigonius and endeavoured as soon as possible to introduce boiling oil into the wounds by means of a tent. This encouraged me to attempt the same with those cases which were entrusted to me. It so happened, however, that by reason of the great numbers of wounded who came in that my supply of that oil ran out. As there were still several cases calling for treatment I saw that, if I was not to appear to have done nothing and to be leaving them in the lurch without any treatment, I must lay on a so-called 'digestive remedy' consisting of yolk of egg, oil of roses, and turpentine. Having done so I passed a sleepless night, for I was depressed and worried about the treatment of the previous day, as I thought it was of no avail. I feared that when on the following day I came to remove the bandages I should find the wounded men either dead or dying in consequence of the poisoned wounds, as I had not cauterised them with the boiling oil. Therefore, I rose very early, visited the sick and observed, quite contrary to my expectation, that those whom I had treated with the digestivum had passed the whole night without serious pain and that neither inflammation or swelling manifested themselves in their wounds; on the other hand, that those I had treated with the boiling oil were in a fever with terrible sufferings and swellings round the wounds. Having subsequently several times had the same experience with many other cases, I came to the resolution never again to treat cases of gunshot wounds with boiling oil."

Little can be added to these words. They demonstrate clearly that Paré, fully recognising the uselessness, indeed the folly of the treatment of gunshot wounds then in vogue, had gone over to, or more accurately speaking had returned, as we should say to-day, to a more conservative treatment. For his expedients coincide in principle and in many details with those which in ancient medicine were adopted by Hippocrates and the medical men who followed him. With respect to the most important principles Paré clearly says, "que pour bien estraire les balles demeurées dedans quelque partie du corps, il falloit situer le blessé en telle situation, qu'il estoit, lorsqu'il fut frappé." Moreover, cases are to be treated by the use in the first instance of cleansing methods, but not the oil (les médicamenter au usant de suppuratifs au commencement, et non d'huile bouillante).[6] Furthermore, he says in support of his view, that gunpowder cannot possibly be poisonous; for in the first place its constituent parts were not of that nature; moreover, that soldiers frequently used it internally as a sort of antidote and went so far as to rub it into sores in order to dry them up. Another widely accepted opinion he also shows to be erroneous—namely, that the balls become so heated from being fired that they burn the wounds which they cause. He says that this is absolutely untrue, "car une balle estant tirée contre une muraille, on la pouvoit promptement teniz en main nue, combien que pour la collision faite contre la pierre, elle devroit encore estre plus echauffée."

Removal of the Missile.

In detail Paré gives the following directions [7] for treatment. After a short introduction on the varying sorts of gunshot wounds according to parts hit and injured as well as the symptoms produced, he gives advice as to first treatment (premier appareil). The wound, if the position of the body permits, is to be enlarged by an instrument, in order to remove dirt or foreign bodies which may have got into it. In order to ascertain the position of the missile the wounded man, as already mentioned, should be placed in the same position as that in which he was when he was hit, "pourceque les muscles et autres parties autrement situées peuvent estomper et empêcher la voye." Then an attempt is to be made to remove the missile with the finger. If this is unsuccessful, by reason of its being too deep-seated or for any other cause, a long probe with a thickened but rounded end is to be used.

The list of instruments for the extraction of balls is fairly long and very cleverly adapted to varieties of projectiles and the wounds caused by them respectively. As regards the former he mentions, amongst guns: bom cardes, canons, doubles-canons, bastards, mosquets, passe-volans, pièces de campagne, couleuvrines, serpentines, basilisques, faucons, fleutes and many others; amongst hand firearms: pistoles, pistolets, petits bidets, petits lezards et scorpions, harquebuses à croc, mousquets and many others. In addition quite a number of explosive bodies which are not projected from a firearm are mentioned, such as mines, sapes, pots à feu, and grenades, &c.

That these very various missiles, which both in their form and effect produced wounds very different from the earlier weapons which Paré himself designates as children's toys, required not a few tools to deal with them is obvious, and we find quite a number of such: toothed tongs in the shape of crows' beaks (bec de corbin dentelé), the lizard's snout (bec de lézard) and many another toothed implement. The "ball extractor" (tirefond) which had a sharp boring tool that turned within a long straight tube served the special purpose of screwing into leaden bullets which were set fast in the depth of the wound and so to extract them. For the widening of the passage of the missile, as well as knives, there were special "dilatatoires," consisting of several arms which could be spread out, like the "specula" used already in ancient days.

Cleansing the Wound.

The general condition of the patient was not lost sight of after the missile had been extracted, and directions as to diet and bleeding were given. If the wound is dirty and

[3] Hans von Gersdorff: "Feldbuch der Wundartzeney," 1517.
[4] Semble: artillery fire and muskets.
[5] A medicament of ancient medicine, compounded of innumerable different things.
[6] Apologie et traité contenant les voyages faits en divers lieux.
[7] Malgaigne: Œuvres complètes d'Ambroise Paré. Paris, 1575. Livre IX., Cap. I. Conf., also Gurlt, Geschichte der Chirurgie, vol. ii., p. 734.

shows no sign of cleansing itself (pourriture) he seeks to bring it about by methods similar to those of the surgeons before his time. In these puppy oil (oleum catellorum) plays a great part. It was made by boiling quite young puppies in oil till they were entirely dissolved, with the addition of earthworms, turpentine, and spirits of wine, and was intended mainly to bring about a mild suppuration. If, however, there are signs of decomposition at the start he combats them by remedial measures (remèdes contrariants à la putrefaction). The chief remedy for this purpose is "Egyptiac" consisting of alum, verdigris, and Roman vitriol boiled into a thick syrup with honey and vinegar. This was introduced into wounds by probes or tents or injected by means of a long syringe. Later on Paré used in place of these instruments metal drainage tubes made of gold, silver, or lead (pourtant j'approuve d'avantage les tentes cannulées, faits d'or, d'argent ou de plomb). Compresses with holes made in them are then laid over the wounds, so as to allow of excretion from the wound to run away; these in their turn are covered with an absorbent sponge, and the whole fixed by bandages. The dressing must be renewed every 24 hours until the wound begins to suppurate, and after that every 12 hours, and in the case of severe suppuration at still shorter periods. When the wound has cleansed itself, mollifying and soothing remedies were used for the after-treatment.

Amputations.

There is no doubt that Paré by these improvements in the treatment of wounds did a great service; not only were innumerable wounded men saved from incurable sickness and from death, but his methods also led to the reform of other branches of surgery, a large number of hitherto faulty methods being perfected. For the military surgeons the chief questions for consideration were his improvements as regards amputation and styptics as well as his directions regarding substitutes for lost limbs (prosthesis) and orthopædic apparatus. With the words, "L'art commande que l'on commence à la partie saine," [8] that is to say, that in cases of amputation a surgeon must always work in sound tissues, and not in the diseased parts, but above them, he sets up an axiom at variance with that of the ancients which to us nowadays is self-understood, but at that time involved a great advance. He very properly, however, limits his laws by directing that the surgeon must always seek to preserve as much as possible of what has remained sound. Paré also considerably improved the methods of carrying out an amputation. The problem of restraining hæmorrhage, which from earliest times was a difficult one, was in his day universally solved by cauterising with a red-hot iron the blood-vessels which were severed in the course of amputating a limb. Even whilst the desired result was achieved in most cases, the severe burning of the tissues produced conditions which were not exactly conducive to a rapid and even healing of the wound, and in which several dangers lay hidden. "Il faut promptement lier les grosses veines et artères si ferme qu'elles ne fluent plus," says Paré,[9] thereby reintroducing the method practised by the ancients, but long entirely forgotten, of tying the arteries. Even if his technique seems still very rough, yet it fulfilled its purpose to such a degree that at one fell swoop it did away with a great part of the dangers of an amputation. And, reviewing the matter, he speaks of the immediately preceding method as "chose très horrible et cruelle seulement à raconter: car cela causait une extrême douleur aux patiens," and, moreover, scarcely one-third of the number so treated escaped with their lives.[10]

Artificial Limbs and Appliances.

Paré dedicates a whole book [11] to the substitutes for lost limbs (moyens et artifices d'adjouster ce qui défaut naturallement ou par accident). Whilst as regards the treatment of plastic operations, that is to say, substitution by living parts, he displays no advance upon his predecessors, but on the contrary on many points, such as his description of plastic treatment of the nose, he is in error, yet he shows himself fully equal to many other tasks. For instance, as regards defects of the palate, arising from shot wounds or other violence, and which may affect the powers of speech seriously, he suggests contrivances which he designates as "obturateurs du palais." They are cleverly affixed to the palate and so entirely cover the orifice that a normal function is again restored.[12] So, too, for ears that have been cut off and for other parts he provides an artificial substitute.[13] Difficult problems such as compensating the loss of power to move a thumb, the extensor muscles of which have been severed, he solves by the application of an appropriate artificial part to the wrist which replaces the power to move the thumb, so that the limb can again be used to hold a sword.[14] By the coöperation of a clever locksmith and mechanic he also was enabled to give descriptions and drawings in his works [15] of artificial hands, arms, and legs, which enabled any capable workman to produce artificial parts in accordance therewith. Thus, he constructed an artificial hand which, by a very ingenious but somewhat complicated mechanism, afforded a certain amount of movement actuated by the muscles of the arm on which it was fixed in a peculiar manner. The same applies in greater degree to an artificial arm which he invented. One of these was probably worn amongst others, by a Huguenot captain who had lost his arm by a gunshot wound at the Siege of Fontenoy. The apparatus is alleged to have worked so well that he was enabled thereby again to handle the reins.[16]

With all the above we have by no means exhausted all Paré's services in the field of surgery. Rather does one feel his improving hand in many details of the treatment of wounds in the days that came after him. And wherever his activity becomes apparent Paré proves himself not only a surgeon in the narrower sense of the word, that is to say, a man who looks upon his profession as manual labour, but as a true doctor; who, in act and deed, follows the maxims which he himself has set forth in verse in his "Canons et règles," [17] and of which one reads:

Science sans experience
N'apporte pas grande assurance.

[8] Œuvres Complètes, Livre X., Cap. 20.
[9] Œuvres Complètes, Livre X., Cap. 22.
[10] L.c., Cap. 25.
[11] L.c., Livre XVII.
[12] L.c., Cap. 4.
[13] L.c., Cap. 6.
[14] L.c., Cap. 10.
[15] L.c., Cap. 12.
[16] Pantheon litteraire, chroniques du XVI. siècle, quoted by Gurlt, Geschichte der Chirurgie II., p. 775, note.
[17] Œuvres Complètes, III., p. 647.

A SYMPATHETIC PSYCHONEUROSIS.

To the Editor of THE LANCET.

SIR,—It may interest your lay correspondent that Mrs. Leather, in her "Folk-Lore of Herefordshire," states that in that county it is quite generally believed that the father frequently suffers as much or more than the mother of his first baby, and sometimes, but more rarely, at the time of subsequent births. The pain may even be transferred to the husband altogether and any tooth, or other ache, affecting the husband at this time is ascribed to the same cause. Mrs. Leather (p. 111) gives three examples. She also reproduces the explanation of an old woman at Garway: "I allus thought as the Almighty appinted that very well, so the poor woman 'ad ha' more strength when the time came." Mrs. Leather suggests that the superstition is the last trace of the *couvade* custom.

I am, Sir, yours faithfully,
MACLEOD YEARSLEY.

Wimpole-street, W., April 16th, 1928.

CENTENARY OF THE INVENTION OF COCOA.

A HUNDRED years ago, in April, 1828, a Dutch chocolate manufacturer, Coenraad Johannes van Houten, discovered a process whereby cocoa-powder as it is known to-day could be made. The cocoa-bean had already been introduced into Europe from Mexico by General Cortes 200 years before this, but until van Houten made his discovery, the cocoa and chocolate industry had remained an insignificant affair, and the housewife who wished to make the beverage was reduced to boiling rock chocolate for a lengthy period. During the whole of this week celebrations are being held in the little Dutch town of Weesp, near Amsterdam, by the members of the family of the inventor, who still control the business, to commemorate the centenary of the beverage they manufacture.

THE DOCTOR'S EMERGENCY REMINDER.

WE have received from Messrs. J. C. Eno, Ltd., a tastefully leather-bound little book of a size to fit the waistcoat pocket which contains useful notes on the stocking of an emergency bag, and hints on dealing with poison cases, hæmorrhage, shock, anæsthetic emergencies, and drowning. The commoner poisons are arranged alphabetically with a summary of symptoms and treatment. Members of the medical profession can obtain the book free on application to the Messrs. J. C. Eno, Ltd., Lever House, Victoria Embankment, London, E.C.

THE Crookes Laboratories, London (British Colloids, Limited), are now represented in America by their associated house—British Colloids Company, 145, East 57th-street, New York—from which Collosol products can be obtained direct.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—The annual conversazione of this Society will be held at the Kensington Town Hall, on Friday, June 15th, at 8 P.M. At 8.30 the Cavendish Lecture will be given by Dr. A. Rollier, of Leysin. His subject will be The Therapeutic, Preventive, and Social Value of Heliotherapy in Surgical Tuberculosis.